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ROTUNDA

the magazine of the Royal Ontario Museum

The Nomadic Bishari of Egypt

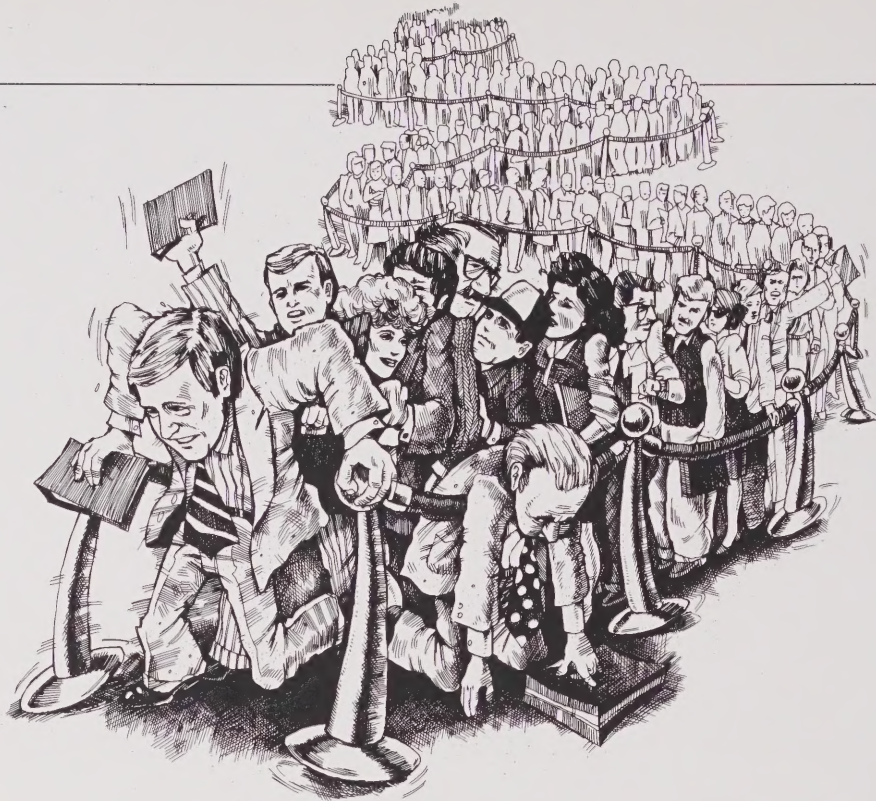
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Making Bread in the '80s

Destination Mars

Great Viennese Porcelain

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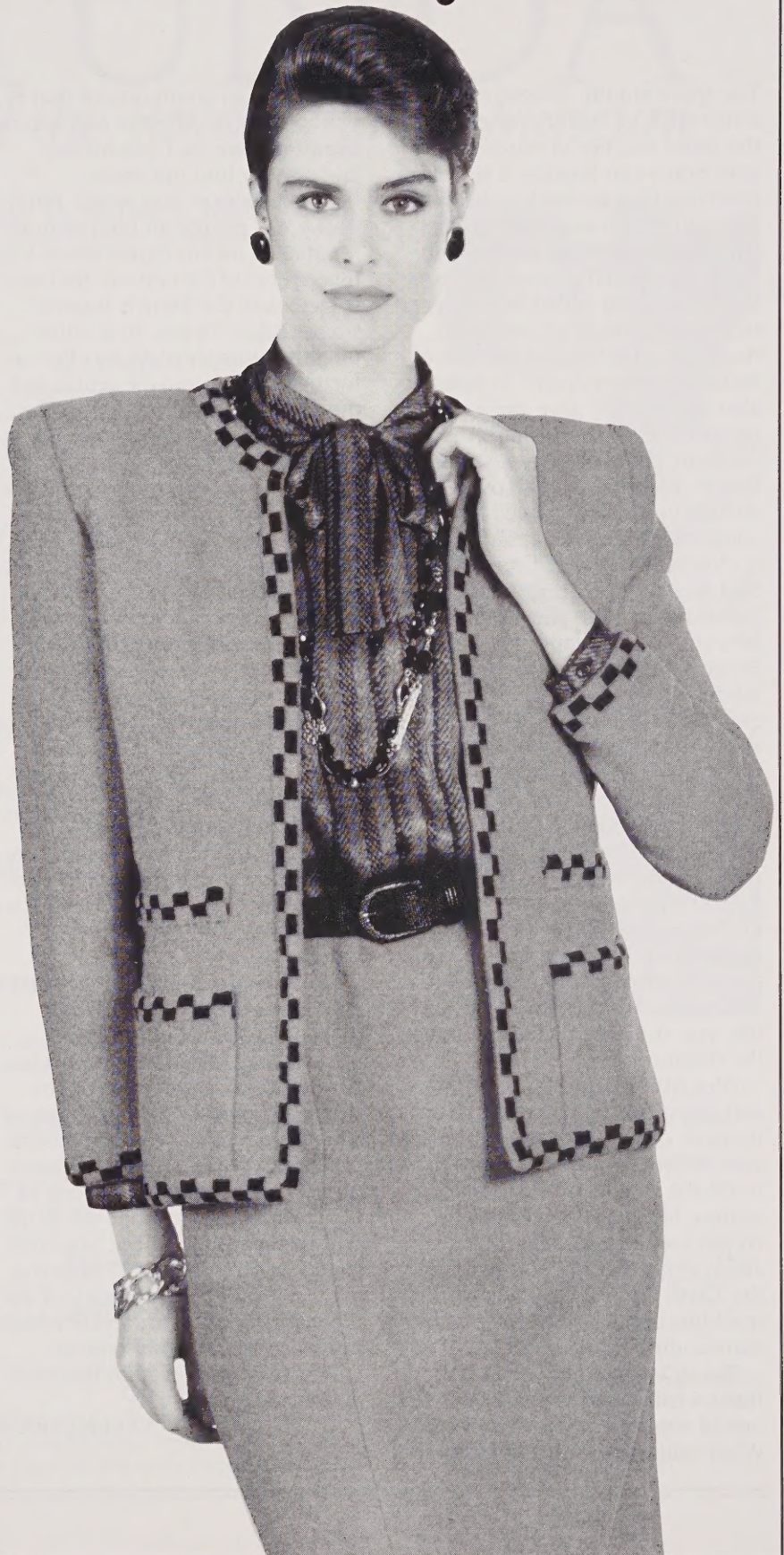


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A few words about this issue

The space shuttle *Discovery* has just returned from its long weekend to the inner reaches of outer space; Americans can breathe a sigh of relief that they are back in the space race. While I was rereading the features in this issue of *Rotunda*, knowing about the successful space shuttle mission added new impact to Richard Longley's article on American and Russian dreams of manned space voyages to Mars. It also surprisingly gave me a new perspective on the Bishari, the nomadic people of Egypt's Eastern Desert, featured in our cover story written by Shelley Saywell. What a complex species we are.

One would be hard pressed to find any common ground between the Bishari culture and the cultures of technically advanced societies. However, the differences can be fascinating. When Saywell tried to explain to a Bishari tribesman that she flew to Egypt from Canada, she was speaking to someone who had never seen an aircraft, never mind a spacecraft, and who could not imagine the world beyond his territory east of the Nile and west of the Red Sea. He was, however, very interested in her stories and his explanation for the year that had passed between her visits was that Canada was very far away and that this was the time needed to travel the distance.

Oleg Atkov, a Russian cosmonaut and physician who spent 237 days in space, described as reassuring the view of the Earth still close enough to fill the windows of the space station, but questioned how he would feel approaching Mars after about a year of travel, knowing that the Earth was just another of the sparkling lights in the vast universe surrounding him.

The difference between the Bishari tribesman and Atkov is less one of sophistication than of scale. What unites us is our difficulty in

imagining an environment that is extraordinarily different and distant from our own and our infinite curiosity to find out more.

CBC producer and writer Harry Rasky has gained an international reputation for his explorations into the psyches of the famous. His latest subject was the French Impressionist Edgar Degas. In a rather unconventional article, he offers us further insights into the genius and the troubled world of one of the greatest and most innovative artists of the last century.

Exploring new worlds or psyches is no fun on an empty stomach, especially during the season between Thanksgiving and Christmas. How appropriate then for Gloria Varley to write about bread, the food often referred to as the staff of life, and the ways of producing enough bread to serve the needs of a nation in the 1980s. As Varley states in her article, there are no tricks; the methods of producing bread in both Weston Bakeries Limited and Grano, the national and local suppliers she visited, are exactly the same as those one would use at home. It is the quantity that is at once fascinating and overwhelming.

And for something simply beautiful to look at over the holiday season, Howard Collinson has written about the exquisite neoclassical porcelains produced in the Imperial Porcelain Manufactory of Vienna under the brilliant direction of Konrad von Sorgenthal. Examples of these and other objects of neoclassical design from the ROM will be on exhibit at the Museum from 3 December until 27 March to mark the 200th anniversary of the French Revolution, the event which provoked the classical revival.

We hope that you enjoy this issue of *Rotunda*.

SANDRA SHAUL

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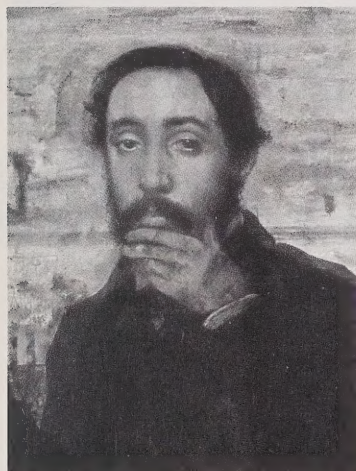
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ILLUMINATIONS

Southern Snow



GLORIA VARLEY

The almond, one of the most delicious nuts, is not a nut at all. What we call the nut is the inner kernel of the pit of a small, soft green, velvety fruit.

Once upon a time a Moorish prince from the Algarve, the southernmost province of Portugal, married a beautiful Scandinavian princess. He was very happy with the match, and so would she have been, except for one thing. The princess pined for snow.

Now the Algarve is noted for many things, but frosty weather isn't one of them. The prince pondered how he could make his wife content, and finally he hit upon the perfect plan. He planted almond trees, hundreds of them, so many that their snowy blossoms clouded the hillsides, turning late January and February into a blizzard of bloom. The princess was ecstatic. No longer did she mourn her icy homeland. And, presumably, they lived happily ever after.

Today, snow-sated northerners may appreciate the legend, but they welcome the flowers for quite another reason. Unlike the princess, they travel to Portugal to escape the cold, and the almond—one of the earliest trees to bloom—is a potent promise of spring.

The almond and its precocious blooms have been around for a long time. When Moses instructed each of the twelve tribes of Israel to place a rod in the tabernacle so that he might indicate his choice of high priest, it was Aaron's rod of almond wood that promptly budded forth. Almonds were mentioned in the Hittite chronicles and found, at the Neolithic level, under the palace of Knossos in Crete. Carbonized almonds were uncovered at Herculaneum and Pompeii, and

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well-preserved examples were taken from a 4th-century shipwreck off Cyprus.

For all its long history, the almond's origin has never been precisely determined, and areas as diverse as western India, the eastern Mediterranean, and Asian Russia have been cited. The Moors introduced the almond to Spain and Portugal—that part at least of the romantic legend is true—and Franciscan friars subsequently carried it to California, which proved a felicitous move. One mature tree, under good conditions, can yield from 10 to 16 kilos of nuts a season and will continue to produce well for fifty years. In California's near-perfect climate, the trees flourished so well that now, two hundred years later, the state provides 140 to 160 million kilos each year, more than sixty per cent of the total crop of the world's most popular nut.

To tell the truth, though, the almond isn't a nut at all. The part we refer to by that common term is the inner kernel of the pit of a small, soft green, velvety oval fruit that is quite as sensuous as any peach. Indeed, *Prunus amygdalus* is from the same family as peaches, apricots, and plums, but unlike its cousins, the almond's thin layer of flesh is rarely eaten because it becomes tough and fibrous when ripe. In some Middle Eastern and Mediterranean regions, however, while the stone is still soft, the unripe fruit provides an early summer delicacy. At this stage, the inner kernel has a texture similar to that of a fresh garden pea, and an intense "green" almond flavour that's most attractive. The almond we eat is nineteen per cent protein and twenty per cent carbohydrate, and gram-for-gram contains as much calcium as whole milk. Unfortunately for the calorie-conscious, almonds are also high in fat, although some comfort may be taken from the fact that the fat is cholesterol-free and high in linoleic acid.

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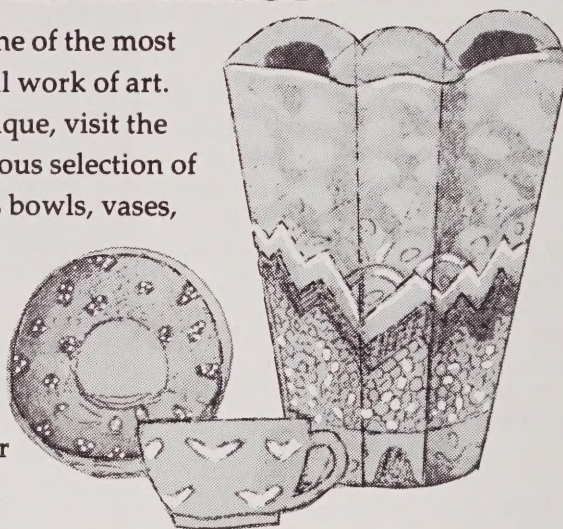
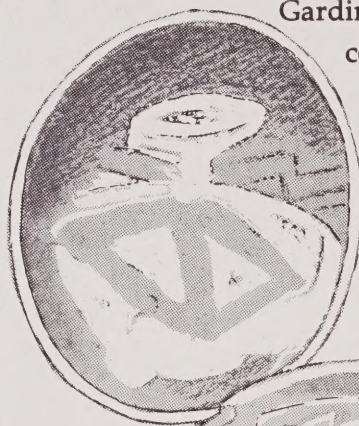
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dulcis (sweet) and *amara* (bitter). Botanically, the two differ by a single gene, bitterness being recessive. Gastronomically, however, the difference is much more marked. For one thing, the powerful taste of bitter almonds has little in common with the mild flavour of the sweet sort. Then there's the matter of poison. Bitter almonds contain a glucoside which, in combination with water, produces benzaldehyde, or oil of bitter almonds, and hydrocyanic (or prussic) acid. This last, taken in sufficient quantity, is a deadly poison. Fortunately, it also disappears with heating, but raw bitter almonds should be used with the greatest of caution. A drop or two of the essence extracted from the oil is a safe alternative when the distinctive bitter flavour is required.

Sweet almonds have been called the most versatile of all tree nuts, and with good reason. They can be eaten raw or roasted; whole, slivered, sliced, or ground; by themselves or as a flavour and

texture enhancement for other dishes. The Portuguese and Spanish still make a multitude of intricate almond-flavoured pastries, custards, and flans, while Middle Eastern cuisine delights in adding almonds to savoury dishes of fish, lamb, and rice. Still, modern cooks would have to go far to equal the uses the almond was put to in 1570, when Pope Pius V's cook offered a banquet that employed almonds in every course: as marzipan in the first; as a cream soup in the second; in garlic sauce and sliced over stuffed geese in the third; and fresh, arranged on vine leaves, at the meal's conclusion.

In England during the Middle Ages, as in much of Europe, almonds allowed the populace to bypass some of the restrictions of Lenten observance. Milk and all its products were among the forbidden foods, so almonds were laboriously ground by hand, boiled in water, then strained and churned or curdled to make substitutes for milk, butter, and cheese.

ILLUMINATIONS

The ancient Greeks held that eating five almonds before a feast would prevent drunkenness and now, in Russia's current campaign to cut drinking, this seemingly curious idea has resurfaced: almonds are an officially endorsed snack because they are believed to reduce the rate at which alcohol is absorbed. If that's the case, it might be wise to serve up toasted almonds at our own parties. The best recipe I've ever found is this one adapted from Elizabeth David's *Spices, Salt and Aromatics in the English Kitchen*. I've no idea if the nuts will keep guests from imbibing unwisely, but I'm pretty sure there won't be many almonds left by evening's end.

* * *

Salted Almonds

These can be made in any quantity, limited only by the size of your baking pan.

Ingredients

blanched whole almonds
a very little sweet almond oil (unsalted butter or mild, highly refined olive oil may be substituted)
coarse sea salt, in a grinder (note: ordinary table salt will not do)
cayenne pepper
baker's parchment, or other grease proof paper.

Method

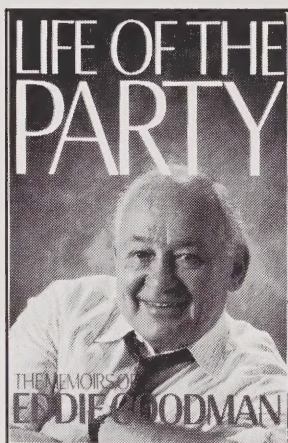
Grease a shallow baking pan—a jelly roll pan is ideal—very lightly with the oil. Cover this with a single layer of blanched almonds and bake in a very slow oven (about 200°F) for 45 minutes until the nuts are a pale toasty colour. Empty the hot almonds onto a large square of baker's parchment paper. Grind on coarse salt to taste and add a whiff of cayenne. Gather up the four corners of the paper, twist them tightly together to form a packet, and put the almonds away in a cupboard to season for five or six hours. (Hiding them is essential, Mrs. David tells us; otherwise they'll be devoured within 15 minutes!) At serving time, tip them into bowls, shaking them free of any excess salt. Watch them disappear.

GLORIA VARLEY

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Black holes: the matter pits

It started out as a mathematical anomaly, the result of taking Newton's law of gravity to an absurd extreme. Mass creates gravity and the more mass you have in a given space, the more gravity you get. If you put a ridiculously large amount of matter in a ludicrously small space, the resulting gravity would be so strong that nothing, not even light would be able to escape the pull. Such an object would become a dark, bottomless gravitational pit, a black hole.

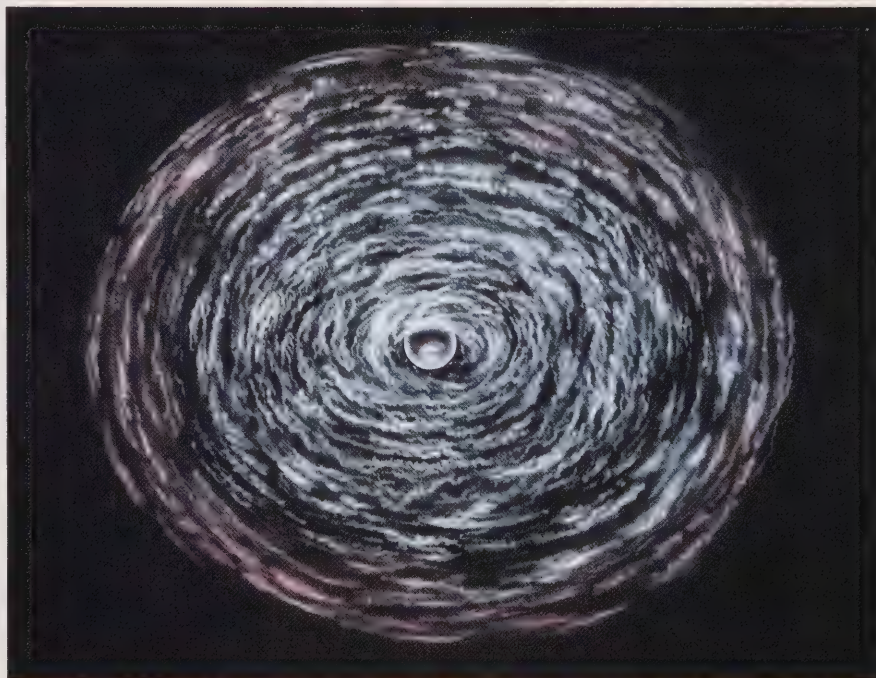
Pierre Simon de Laplace, in 1798, was the first person to follow this line of reasoning. There was nothing wrong with his mathematics, but it was difficult to take the idea very seriously. How, for one thing, could you detect such an object? How, for another, could you possibly compress enough mass into a small enough space—say the mass of the Earth into a space eight centimetres in diameter—to form a black hole?

Despite the mathematical equations, it was quite unthinkable for the 18th-century mind that such a thing could happen by natural processes. And so black holes sat on that special shelf in the pantry of physics reserved for the abstract, the absurd, and the unverifiable.

It is to this shelf that scientists turn when they encounter the inexplicable. In the last few decades astronomers have discovered a series of bizarre objects: stars that orbit invisible companions; galaxies with violent and explosive cores; and quasars, distant objects that produce more energy than dozens of galaxies in an area the size of the solar system. At first tentatively, then with growing conviction, and now with virtual certainty, astronomers have turned to black holes to explain these phenomena.

The story of black holes is really the story of gravity, and gravity, in turn, is what governs the lives of all stars. Gravity is what causes a star to form from a tenuous cloud of interstellar gas and dust. Under the right conditions such a cloud con-

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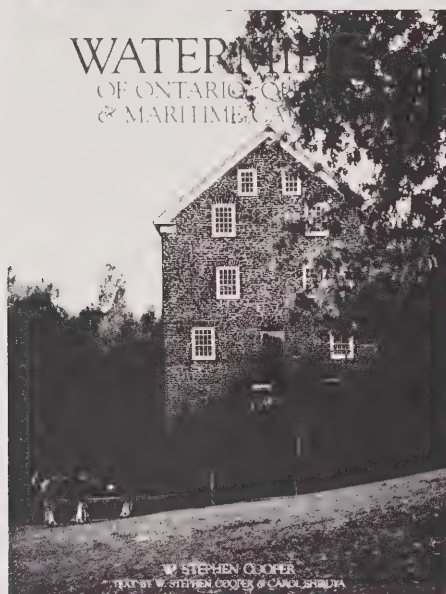
These artists' conceptions describe what the matter around black holes may look like.

tracts under its own weight until its interior becomes hot enough to sustain nuclear reactions. Once the young star begins to produce energy, the pressure from the intense heat in its core pushes outwards, balancing the squeeze of

gravity, and the gravitational collapse is halted. As long as enough energy is produced in the star's core, the star is able to support its weight.

When the star exhausts its supply of nuclear fuel, energy production

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comes to a halt. With no energy production there is not enough heat to create the pressure needed to balance the squeeze of gravity. The star, or at least its central regions, begins to collapse again. In some stars, the collapse is halted when a new kind of pressure, created by the mutual repulsion of electrons in the star's matter, resists any further compression. What is left is a white dwarf, an object with about the mass of the Sun packed into a volume about the size of the Earth.

This so-called degenerate electron pressure can support up to 1.3 times the mass of the Sun. Beyond that limit, gravity wins out. Such a situation can occur in the death of a very massive star. The intense gravity squeezes the electrons and protons in the star's matter until they merge, forming neutrons. The neutrons then create a pressure of their own to counter the squeeze of gravity. What is left is a ball of neutrons about twenty kilometres in diameter and weighing 2 or 3 times as much as the Sun. This is a neutron star.

The degenerate neutron pressure can only support up to three solar masses. If more material than that accumulates, gravity wins out again. This time there is nothing to stop it. The matter collapses inward on itself in a headlong rush to oblivion.

As it collapses, the object's surface gravity becomes stronger and stronger until even light cannot escape its grip. At this point we have a black hole. Like the Cheshire Cat that disappears leaving only its smile, the matter disappears into the black hole leaving only a gaping gravitational maw.

What lies inside the black hole? Quite simply, we don't know. Our present understanding of the laws of physics does not allow our theories to penetrate the boundary of a black hole. Of course, there has been some speculation, educated guesses that occasionally verge on science fiction. Perhaps the holes are gateways to other universes. Maybe time travel could be accomplished by skirting a large black

hole. For now these ideas go back on that special shelf in the pantry of physics.

As one can well imagine, observing black holes is not very easy. They emit no light of their own. Yet their presence can be inferred from their effects on their surroundings. Their voracious appetites and strong gravitational pull can be used as indirect proof of their existence.

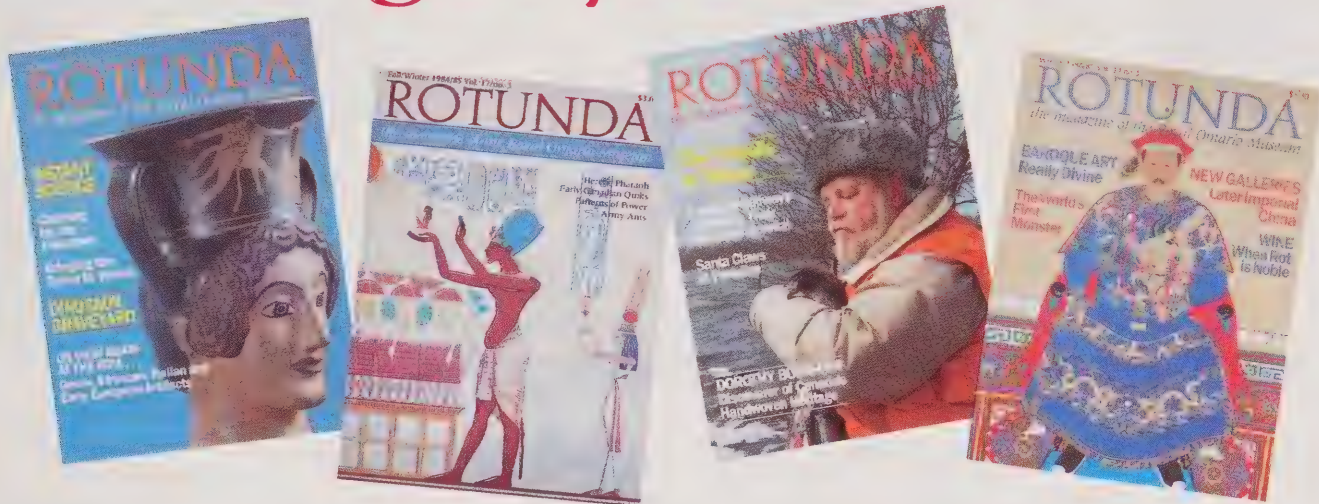
Consider a black hole and a normal star, orbiting one another. (More than half the stars belong to such double or multiple systems.) If the black hole and its partner are close enough together, gravity will pull gases from the star to the black hole. The gases stripped by the black hole do not simply disappear; they form an accretion disc of material spiralling down into the hole, somewhat like water swirling down the drain.

Turbulence in the whirlpool of gases generates heat. At the inner edge of the accretion disc, before it disappears into the hole, the gas can reach temperatures in the millions of degrees. At those temperatures, the gas emits a great deal of X-rays. Normal stars do not generate a great quantity of X-rays, so when astronomers detect a normal star orbiting an invisible companion that is emitting a lot of X-rays, they start speculating about the presence of a black hole.

Such is the case with an X-ray source known as Cygnus X-1. Professor Tom Bolton of the University of Toronto studied the motions of the star associated with Cygnus X-1. From the size and period of its orbit he was able to calculate that the unseen companion had a mass about ten times that of the Sun. The companion cannot be a star, and it's too heavy to be a white dwarf or a neutron star. The only remaining alternative is a black hole.

Even larger black holes are thought to lie in the centres of galaxies. John Kormendy, of the Dominion Astrophysical Observatory in Victoria, B.C., has studied the motions of stars in the nucleus of the Andromeda galaxy. He found

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ILLUMINATIONS

that the stars were orbiting the centre of the galaxy much faster than expected. This unusually high velocity could be explained if there was a black hole containing ten million solar masses at the heart of the galaxy. It's circumstantial evidence, but there are other reasons to believe that galaxies contain monstrous black holes.

Quasars, which are thought to be embryonic galaxies, are the brightest objects in the universe. Some emit as much energy as a hundred normal galaxies from an area barely larger than that of our solar system. John Hutchings, also of the Dominion Astrophysical Observatory, has found good evidence that a quasar is a young galaxy with a huge central black hole that is colliding with another, smaller galaxy. Matter from the smaller galaxy, falling into the black hole, energizes the quasar.

The light from quasars is very old. It reaches us across a huge gulf of space and time. The light from the most distant quasars was emitted as long as sixteen billion years ago, when the universe was still very young.

Today quasars seem to have settled down. But we do see signs of moderate activity in the cores of neighbouring galaxies, such as powerful radio emissions and jets of matter spewing into space (black holes are voracious, but very messy, eaters). These factors all point to super-massive black holes in the cores of the galaxies.

Even our Milky Way galaxy may contain an enormous black hole. From the motions of stars we know that there are millions of solar masses of material in the central few light years of our galaxy. We know that there is a powerful and compact source of energy there. Right now things are fairly quiet, but there is evidence of dramatic and violent activity in the not too distant past. It is quite likely that in the centre of our galaxy, there lies a million-solar-mass black hole, waiting to devour unwary stars or nebulae.

JOHN KENNY

A story in the glass



ANN RITCHIE

This setting may look unsavoury but it is beneficial to the development of the wine in the bottles. Some wines become more refined when stored in glass bottles that are stopped with corks and kept in cool dark cellars.

In the beginning grape wine was a very simple beverage that was brought in a clay or pewter jug to the table, directly from the family wine cellar. However, it eventually became important to find ways to store and preserve wine over long periods of time as well as to improve its quality. The Romans, for example, were faced with these problems on a very large scale as they were building their empire, and it is through them that viniculture and wine production spread across Europe.

Greece was the first European centre for grape wine production. However, as the Romans built their empire, they transported wine and then grapevines further and further afield. Wine was an integral part of the daily food ration of the Roman legions, and wherever forts were built, vines were planted. Vineyards spread throughout France via the network of rivers. And it was also through the Romans that Tarragona, a region of the Iberian

Peninsula, became a centre of wine production.

Until about the 4th century A.D., wine was both fermented and stored in terracotta containers called *doliae*. Because of the taste that the *doliae* imparted to their contents, the wine often had to be spiced and resinated to improve the flavour. This tradition has continued with such well-known wines as the Greek retsina.

For transportation over long distances by land or sea, wine was transferred to large clay amphoras, each with an average capacity of twenty-five litres. There was also a larger amphora that could carry as much as four hundred litres of wine, equivalent to our modern-day wine containers used to ship wine across the ocean. The amphora also symbolized the body as the container of the soul; Pandora's Box, from Roman mythology, was an amphora containing all the vices and virtues of mankind.

Although wine could be shipped

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great distances, preserving it remained another matter. In the earliest days wine was stored in large earthenware jars topped with olive oil, which sealed the liquid from contact with the air and prevented the oxidation that leads to spoiled wine. This method could preserve the wine for about a year. By 600 B.C., the Romans discovered that by sealing the amphoras with plaster of Paris instead of olive oil, the wine would remain good for a longer period of time.

During their conquests of France and England, the Romans found that the amphoras were too bulky and heavy. They therefore began to use wooden casks instead. Wood, which is slightly porous and contains varying amounts of tannin, depending on its source and age, is ideal for wine storage and aging. In fact wooden casks are now an integral part of the winemaking process.

More far-reaching changes to the flavour of wine and to the attitudes of its consumers took place well after the time of the Romans. In the 16th century, glass bottles were introduced to the processes of winemaking and marketing.

Winemakers quickly discovered that some wines could improve in glass bottles. Bottling changed the entire aging process and led to the development of the cork as an effective stopper. Not only does wine last longer in a bottle, but a fine wine loses its initial fresh grape scent, which is replaced by a more complex bouquet. The length and quality of a cork greatly affect the aging potential of wine in the bottle: the longer the cork and the higher the quality of cork grain, the slower the rate at which oxygen penetrates the wine inside the bottle. This permits a more gradual development of the wine. Before corks, the olive oil and plaster of Paris prevented any air from reaching the wine and therefore no development could take place.


Of course, not all wines are meant to be aged, and so nowadays the techniques of bottling vary. It stands to reason that wine stored in bottles

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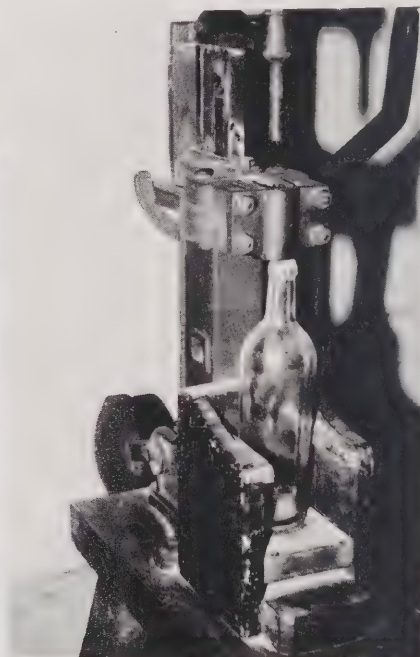
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with screwcaps has no aging potential and is ready for consumption as soon as it is available; and there is thus no need for the bottles to be stored on their sides. And for wine that is meant to be consumed when it is young, the corks used are short, of lower quality, and hence less expensive.

With the introduction of clear glass bottles, the visual enjoyment of wine became an important consideration in addition to taste. Fining is a process that clarifies wine. Egg whites are added to the top of the barrel of wine and allowed to settle to the bottom over a period of days or weeks. As they settle, they take with them many of the impurities and solids left in the wine. Fortunately for many dessert lovers, the surplus egg yolks are not wasted. In France they are prepared as sabayon and in Italy as zabaglione.



This type of machine was used to cork wine bottles in Portugal.

The advent of the bottle also created marketing opportunities for wine merchants. Over the years, distinctive bottle shapes and labels have been developed to identify the region of origin. For example, the traditional shoulder-shaped Bordeaux bottle is distinct from its sloping-shouldered Burgundian

— ILLUMINATIONS —

counterpart. Alsace's flute-shaped bottle differs slightly in size and shape from the one used in neighbouring Germany, which is taller and more sloped. Spain frequently uses a frosted, opaque bottle for its *cavas* or sparkling wines, and many of the Spanish producers in Rioja continue the tradition of enclosing each bottle in a gold-wire netting to assure the consumer that the contents have not been tampered with.

In the mid-19th century the Melini family, famous producers of Chianti in Italy's Tuscany region, solved two common problems with bottles—their fragility and their tendency to roll over instead of standing upright—by reinforcing them with wicker baskets. The bottles, called *fiascos*, were easily carried by a straw loop attached to their necks. Local villagers would carry their wine bottles to outdoor theatres, where it was customary to express displeasure with a performance by throwing the bottles (and other things) at the unfortunate troupe. That is why theatrical disasters became known as *fiascos*.

The first machine-made bottles were used in Cognac in 1894. Today, a modern glass plant that is highly mechanized and directed by computers can manufacture, on average, sixty to eighty thousand bottles per hour, each conforming to a certain standard shape and size that will resist thermal and mechanical shock. For the storage of sparkling wines, the bottles must also be able to withstand intense internal pressure.

But before we imbibe let us not forget the complement to the glass bottle. Many of the major viticultural regions throughout the world have created their own specially shaped wine glasses. There is a broad range from the numerous kinds of flute-shaped glasses for champagne to the small *copita* of Spain's sherry region. And like the bottles, each glass is designed to highlight the best characteristics of its wine.

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The ROM's Department of Ethnology has recently acquired a rare Great Lakes Indian pouch with the assistance of a Cultural Property Grant under the terms of the Canadian Cultural Property Export and Import Act. The pouch, consisting of a single pocket and flap made from tanned, dark-brown-dyed skin, is decorated with superb porcupine-quill embroidery which includes a Thunderbird motif. Holes punched along the base of the pouch indicate that there was once a tassel fringe.

Our information suggests that the pouch was collected between 1856 and 1864 by Hamilton T. Forsyth, an English officer posted in Upper Canada. The pouch, dating to c.1800, is attributed to the Ottawa or the Southeastern Ojibwa Indian groups. By the 1820s, such pouches seem to have been replaced by other types.

This pouch may have been used to carry personal medicines, tobacco, or war and hunting implements. However, it is the Thunderbird motif that is most significant. It is the Algonkians belief that the Thunderbird is a benevolent manitou (spirit) that influences the weather and is swift and fierce in its battle against the evil Underwater Panther. The beating of its wings creates thunder and the flashing of its eyes creates lightning, which are directed in fury at the Underworld.

Through visions, humans are able to attain the assistance of manitous, and the powers that the manitous bestow are retained through visual imagery. The powers of the original owner of our pouch, which were gained through vision, were manifested in the Thunderbird images; and through these images he also expressed kinship with his culture and the cosmos.

The department is also fortunate to have received a gift of an Asante stool from Mrs. E. M. Stephens of Victoria, British Columbia. The stool is from Ghana and dates to the late 19th or early 20th century.

Wooden stools have been important to the Asante people for many centuries. Like the ROM's stool,



Top: The intricate quill embroidery is one of the most striking features of this rare Great Lakes Indian pouch.

Bottom: Wooden stools, like this one recently donated to the ROM, are very important to the Asante people of Africa.

most have a rectangular base, a supporting column, and a rectangular seat with upturned, curving ends. However, the stools have various uses. The most common stools, which are unadorned, are used by adults while discussing important issues. Men sit on them while weaving and women while

they prepare food. More elaborate stools are linked to rank and political authority. One chief or, stool, might have several villages under his jurisdiction. The Asantehene, or king, possessed stools decorated with gold or silver.

KENNETH LISTER
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THE TRIUMPH OF

*The Imperial Porcelain
Manufactory of Vienna
flourished with the
perfect blend of
creativity and business
acumen*

Howard Collinson

ALTHOUGH it takes place in the 18th century, the story of the Imperial Porcelain Manufactory of Vienna has a contemporary ring. Having failed in its attempts to effectively run the company and then to privatize it, the government hired a management consultant named Konrad von Sorgenthal. But unlike so many similar episodes, this tale had a happy ending. Sorgenthal reorganized the manufacturing and marketing sides of the firm, which resulted in high-quality merchandise and greater profits. He then took over the business from 1784 until 1805, and under his leadership the factory produced small tablewares, renowned for the high standards of their painted decoration.

The factory at Vienna was founded in 1719, only nine years after Europe's first hard-paste porcelain factory was opened in Meissen. At Meissen the process of porcelain manufacture was regarded as a state secret; workers were virtually kept prisoner in order to prevent rival factories from springing up. Nevertheless, Claudius Innocentius Du Paquier, a civil servant and porcelain enthusiast, lured away two employees who brought with them the treasured secret of the manufacture of porcelain, enabling him to start a new factory in Vienna.

For the next quarter century, Du Paquier's factory produced tablewares and figurines that remain among the most highly prized objects in the history of European porcelain. Despite that, he was never able to run his factory on a firm financial basis. Contemporary writers praise the quality of his work but are aghast at the high prices.

The factory was taken over by the State in 1744 and it continued, always financially insecure, for forty more years. In 1783, Emperor Joseph II made an unsuccessful attempt to sell it, and that is why, in 1784, he decided to hire

PHOTOGRAPHY BY BILL ROBERTSON

This superbly painted cup and saucer show the high quality of work produced during the Sorgenthal years at the Imperial Porcelain Manufactory of Vienna.



VIENNESE PORCELAIN

Konrad von Sorgenthal as a management consultant. Sorgenthal, a merchant who had previously saved a woollen mill from bankruptcy, instituted a number of changes in the management of the company. He revised the methods of bookkeeping to reflect current accounts more accurately. He made aggressive marketing decisions: while continuing to produce excellent goods, he lowered prices, realizing that the largest profits were to be made by an increase in the sales volume.

He also understood the value of a well-trained staff, and he maintained the tradition of having the chief modeller as artistic head of staff. Anton Grassi held this post from 1784 until 1807. However, the factory was reorganized into new divisions reflecting the technical and artistic specialties involved in porcelain manufacture.

The painters enjoyed the highest status at the Vienna factory. They were divided into two major groups. There were the "blue painters," who worked on only the primarily cobalt-blue underglaze decoration, and the "colour painters," who created the final overglaze decoration.

It was the colour painters who provided the crowning glory of Vienna porcelain from the Sorgenthal period. Specialized in their work, these artists were divided into four categories: figure painters, flower painters, landscape painters, and design painters who produced only abstract motifs.

Under Sorgenthal, the standards for these painters were high. Before starting, new apprentices had to pass a course in drawing. They began as blue painters and if they were sufficiently talented they progressed to the level of colour painters. There was an in-house art school where lessons were offered by senior painters; the better painters were rewarded with bonuses. To retain his talented staff, Sorgenthal offered competitive wages, a form of disability insurance, and even pension funds and widows' benefits.

Sorgenthal and his artistic directors were also sensitive to changing tastes. They realized that the rococo style, exemplified by the delicate, colourful fantasies on Meissen porcelain, was no longer fashionable in the decorative arts. Neoclassical designs, developed mainly at the French Royal Porcelain Factory at Sevres, had become the latest rage. Consequently Sorgenthal decided to adopt the neoclassical style for his porcelain.

While other leading porcelain factories responded to this new fad by hiring Italian artists familiar with the art of ancient Greece and Rome that had inspired the new style, Sorgenthal chose instead to send Grassi, his own artistic director, to Italy in 1792. There Grassi studied classical antiquity as well as the latest products of neoclassical art. He made drawings after classical remains and assiduously collected engravings to send back to the factory to be used as models by the painters.

The European Department of the ROM is fortunate to have a sizeable group of Imperial Porcelain Manufactory of Vienna pieces produced during the Sorgenthal period, several of which are on long-term loan from a private Canadian collection. Through these splendid pieces the gradual change from rococo to neoclassical design can be seen.

An interesting example of work from the transitional period, and the earliest piece at the ROM, is a tray from a *déjeuner*. *Déjeuners*, coffee sets for one person, were a top seller for the Vienna factory. They consisted of six pieces: cup and saucer, coffee pot, creamer, sugar bowl, and tray. Produced between 1770 and



The serving tray was part of a *déjeuner*, a coffee set for one, produced c. 1770-75 and decorated c. 1790. Although the irregular shape of the tray is a purely rococo design, the painted decoration is neoclassical.

Anton Kothgasser painted the gilded cup and saucer on the right; the number 96 impressed on the bottom of each piece identifies him. Both pieces are dated 1790. The cup and saucer on the left, produced in 1803, display Leithner blue, the particularly strong and even shade of cobalt blue named for its inventor. The scene on the cup is the Italian coastline at Terracine, Italy.

1775, the tray at the ROM is typically rococo, with its curving, irregular outline and organically shaped handles. Later, more purely neoclassical trays are shaped as simple ovals or rectangles. However, the painted decoration on this tray is neoclassical, probably executed in the late 1780s. The major decorative motif of the tray is the *guilloche* pattern—intertwined bands derived from ancient Roman architectural decoration. The central panel imitates an ancient gem or cameo, which appears to represent Bacchus and Ariadne. However, even within the neoclassical scheme, the side panels, with amorous pastoral scenes painted in a delicate grey, are very much in rococo taste.

The long interval between the production of the porcelain body of the tray and its final decoration is not typical of the factory but it does serve as a warning for the scholar attempting to date other pieces. Fortunately, beginning in 1783, the year of manufacture was stamped into the bottom of the piece before firing. Unfortunately, the painters who decorated the wares did not date their work, leaving scholars and collectors to guess at the dates of decoration. And given that certain styles were in use for years—there are several cups and saucers at the ROM of a style used throughout the 1790s and into the early 19th century—it is always possible that the painting postdates by several years the date on the porcelain.

Although the painters did not date their work, they did sign their paintings with identification numbers. However, the tiny numbers, like the decoration itself, were painted on over the glaze and so were easily worn away with use. They are missing from most of the ROM pieces.

An exception is a magnificent cup and saucer, decorated with gilding and painted floral motifs. The date impressed in the bottom is 1790, and the number 96 painted on the underside of both cup and saucer identifies them as the work of Anton Kothgasser. Kothgasser is well known as a painter of porcelain in the Vienna factory, but even more so as the painter of landscapes on elaborately decorated luxury drinking glasses, popular in early 19th-century Vienna.



The painters at the Vienna factory were famous for their ability to depict intricate scenes on a miniature scale. Two delicate images of women, rendered in precise detail and conveying a gentle mood that is quite touching, are breathtaking examples of the exquisitely sensitive paintings produced by the Vienna artists. The first painting, which is on a cup dated 1792, shows a woman with two children, a common 18th-century representation of Charity. The grey and silver pattern is typical of early neoclassicism. While delicate, the simplicity of decoration makes the cup appear almost monumental in scale.

The second painting is a portrait on the cup of a truly outstanding cup and saucer set from 1792. The woman portrayed is painted in a subtle and sensitive manner more often associated with much larger paintings. The face seems so precisely rendered that it is difficult to believe that this may not be a portrait of a real person. There are three clover blossoms on the saucer and an inscription in French that translates as: "You're the one in my heart." The combination of the portrait and the demure clover blossoms and loving inscription surely indicates that the set was commissioned as a special gift.

Mythological scenes, such as those found on two small cups in the ROM collection, were also popular subjects. The compositions, remarkably detailed yet each measuring about five centimetres tall, display the most impressive draughtsmanship. Furthermore, because the paints always changed colour when fired, the artists had to paint their compositions while imagining how each area would look after firing.

The first mythological scene, on a cup dated 1802, shows Venus offering Juno a girdle that would make her irresistible to men. The rescue of Andromeda by Perseus is illustrated on the second cup, dated 1803. The painter of this cup had so much prestige in the Vienna factory that he was allowed to sign his name to his work. Barely visible in the lower left corner is the signature of Johann Forstler, who worked in the factory from 1797 until 1820.



The simple geometric shape of this vase comes directly from ancient Roman sources; classical scenes decorate the faces. The technique of creating flat and three-dimensional gold decoration on the vase was also an innovation of the Viennese factory.

Left: The loving portrait of a woman and children, painted in 1792, represents Charity.

Right: "You're the one in my heart" is the translation for the tender inscription on the saucer. Was it addressed to the woman portrayed on the cup? Painted in 1797 this cup and saucer set is a tribute to the wonderful ability of the factory painters to produce intricate scenes on a miniature scale.





Above: Mythological scenes were popular subjects for porcelain decoration. The rescue of Andromeda by Perseus is illustrated on this cup.

Below: This covered bowl and saucer would have been produced for display in a cabinet. The female figures on the bowl were copied from Roman wall paintings at Pompeii. The handles have been gilded and painted to look like bronze, one of several innovative techniques developed by Josef Leithner, the factory chemist.



A large vase is more obviously neoclassical. Produced in 1799, its simple geometric shape comes directly from ancient Roman sources, and scenes of classical figures decorate the main faces. The elaborate gold decoration of the vase was a technical innovation of the Vienna factory. Not only does the gold shine brilliantly, but the pattern is actually three-dimensional. Numerous layers of gold decoration were applied, burnished, and fired to build up a pattern composed of both flat decoration and decoration in relief that is more highly polished.

This technique of relief gilding was soon copied by other factories, just as the Vienna workers produced pieces imitating the products of Sevres. The Vienna factory even created porcelain to look like the blue and white jasperware invented by Josiah Wedgwood in England. Rival porcelain factories had to stay up to date with all the latest trends and fads. The competition for the luxury market was intense and any successful innovation would be immediately copied in countless "knock-offs."

An unusual small cup made in 1803 is a fine example of very trendy neoclassical taste. This miniature version of a Roman urn has legs in the form of lions' legs. Scenes of escaping Cupids, based on Roman wall paintings found in Pompeii and Herculaneum, are portrayed on the cup. The excavation of the Roman sites in the mid-18th century caused a sensation, which in part was responsible for the birth and popularity of neoclassicism. The wall paintings became well known through the publication of engraved copies. It is just such a set of engravings that Grassi probably brought back from his trip to Italy.

Roman wall paintings were the models for the richly coloured figures and foliage that decorate a cabinet cup in the ROM collection. Such cups were meant primarily for display. The large covered bowl is painted with a female figure on each side, copied from figures in the Pompeii wall paintings. The handles, which are in the form of female figures, are partially gilt and partially covered with a colour that imitates bronze—a technical innovation of Josef Leithner, the Vienna factory *arcanist*, or chemist.

The *arcanist* was responsible for developing the colours for glazes. Colours had to be able to withstand the heat of firing without becoming uneven or losing their brilliance. Another of Leithner's numerous inventions was a particularly strong and even shade of cobalt blue, which became known in porcelain factories across Europe as Leithner blue. An 1803 cup and saucer that also has an elaborate gold design displays Leithner blue at its best. There is a scene of the Italian coastline at Terracine, between Rome and Naples, painted on the cup. This view of Italy was probably a copy from an engraving.

The works in the ROM collection are a testament to the superb porcelain produced by the Imperial Porcelain Manufactory of Vienna during the Sorgenthal years. The factory that the Emperor had failed to sell in 1783 was, by 1805, making sales of 400 000 gulden a year with profits of more than 74 000 gulden. The number of employees jumped from 350 in 1786 to 650 by 1805.

Sorgenthal had found the key to survival in a late-18th-century industry that required a combination of high technology and high fashion sense. He was able to retain his staff and maintain production standards by offering competitive wages and the prospects of promotion to his employees as their skills improved. Modern managers might take a lesson from his success in the cut-throat world of international trade. ☺



This small cup, a miniature version of a Roman urn, is decorated with scenes of escaping Cupids based on Roman wall paintings from Pompeii. It is dated 1803.

Below: Venus offering Juno a girdle that would make her irresistible to men is the delightful subject portrayed on this cup produced in 1802.

Dr. Howard Collinson is assistant curator in the European Dept., ROM. He is a curator of the exhibition Truth and Beauty: Neoclassicism in the Decorative Arts, on display at the ROM from 3 December 1988 until 27 March 1989.



THE BISHARI

People of this land

*The Eastern Desert of Egypt is truly home
to this extraordinarily resourceful people*

Shelley Saywell

GUIDED by stars and tracks, our convoy of jeeps drove side by side. Three streams of head lights pierced the blackness to reveal a mysterious landscape of sand and rock, marked by the bleached white skeletons of camels. Our journey, both wonderful and frightening, was taking us deep into Egypt's Eastern Sahara, where accompanied by Egyptian anthropologist Shahira Fawzy, we would film her work with the isolated and little-known nomads of an ancient tribe called the Bishari.

Dawn broke and the sun rose to reveal a vast expanse that appeared to undulate behind a veil of heat. I was curious to know what kind of people could survive in such a barren wasteland. In three trips to the Egyptian desert over the next two years I gained a tremendous respect for the proud inhabitants who call themselves simply, "the people of this land."

The Eastern Desert of Egypt is one of the hottest and most inhospitable regions in the world.

Inset: At home in the desert, two Bishari prepare *gabana*, coffee mixed with a combination of ginger and herbs. Behind them are the ruins of a Roman building.





Shahira Fawzy first came across Bishari women herders on the shoreline of a remote fjord of Egypt's Lake Nasser in the summer of 1975. At the time she was conducting a survey on environmental pollution as an undergraduate at the American University of Cairo. She was later told by Egyptian authorities that this region of the desert was uninhabited; they speculated that she had seen a caravan from the Sudan. But the women Shahira had met, though they spoke no Arabic, had uttered the word "Abraq" and pointed north. Abraq, a region of dry wells in the Eastern Desert had long been considered barren. Shahira became obsessed with learning more about these mysterious desert dwellers.

After changing her university major to anthropology, Shahira began extensive research. She learned that the Bishari, who are related to the Beja of the Sudan, were no longer thought to live in the Egyptian desert. Some were known to have settled along the desert fringes, but the others were believed to have left the desert, possibly to join the Beja further south.

Shahira began living among some of the Bishari who had settled in "squatters camps" on the desert's edge not far from Aswan. These people spoke a mixture of Arabic and the desert language *To Bejawi*, and Shahira learned some of their language and customs. They were amused by her interest. But Shahira learned also that there were in fact Bishari nomads living in the desert, and that these settled communities of their kinsmen on the edge of the desert, known as *as-hab el manakh*, (those of the camel's resting place), are their only contact with the outside world. The strongest young men from the desert, called *galabas*, come to these settlements, where their settled cousins act as merchants on their behalf by trading for them in the city markets. Using this network the nomads of the desert have been able to maintain their isolated existence, remaining relatively unknown to Egyptian society.

In many ways this is not surprising. Nomads, by their very lifestyle, defy attempts at census-taking. The Bishari avoid the Egyptians, who speak a different language. Shahira also discovered that it was in the interest of some of their kinsmen to keep them unknown. Near the southern city of Daraw there exists a secret society of smugglers of Bishari descent, who have run a vast desert operation for more than a hundred years. Early in her research Shahira befriended a local woman to gain entrance into their forbidden world.

Behind a walled compound, in a scene that recalls the *Arabian Nights*, the sheik of the smugglers reigns in a dimly lit palatial headquarters. Around him men huddle in conference, smoking hookahs. Servants move as silently as shadows, and the women stay out of sight.

Until 1949, when Saudi Arabia banned slavery, the smugglers ran a slave trade from the Sudan to Saudi Arabia. Today they use their ancient desert



The nomadic Bishari live in small tents called *bershes*.



Although the outside of the *bersh* is a sand colour, making it difficult to spot in the desert environment, the interior is decorated with brightly coloured carpets and other textiles. The women wear simple but colourful garments and exotic pieces of jewellery.

routes to transport other contraband. To keep away curious Egyptians they have spread myths about wild men and cannibals who inhabit the desert mountains.

Shahira eventually won the trust of the *galabas*. When one nomad's camel died, she offered to take him back to his people. Because his family was depending upon his return for flour and other necessities, he accepted. This was the beginning of a lasting friendship and of Shahira's life in the desert proper.

Egypt's Eastern Desert is home to two related tribes, the Ababdah and the Bishari, an estimated 20 000 people whose territory extends from Edfu, one hundred kilometres north of Aswan, to Is on the Sudanese border, and from the Nile to the Red Sea. This desert assaults the senses. It is an area of barren, broken rock and sand, distinguished by a mountain range deep in its interior. The Ababdah and the Bishari have steered their caravans through the mountain valleys, or *wadis*, for an estimated 5000 years.

This is one of the most inhospitable regions of the world. Yet the tribes have somehow maintained a tenuous accommodation with the land, eking out an existence by herding and following the sparse rainfall as they migrate between their seasonal pastures near the Nile and the Red Sea, which they refer to as the *Sweet* and the *Salty*.

The Bishari are intimate with their natural environment by necessity; aware of its unseen dangers and in tune with the vagaries that threaten life. Travelling in small groups in order to lessen their burden on the meagre resources of the land, they are adept at camouflage. Tents (*bershes*) are pitched amidst the rocky enclaves or behind the recesses of the valleys, wherever they are best hidden. These homes, about 2.5 metres wide and made from woven leaves



Ruins are all that remain of the abandoned mine at Wadi el-Alaqui, first worked by the Egyptians in 1300 B.C. The Bishari believe that they are the guardians of this and other mines.

of the dom tree, are sand-coloured and almost impossible to spot. Each household owns a dog to guard the camp from wild animals that roam the mountains. Cheetahs, hyenas, mountain cats, and deer pose a variety of threats, as do the many snakes and scorpions. The barefooted nomads use a combination of common sense and finely honed intuition to avoid danger. To provide a lifelong immunization against scorpion venom, they sting a child's ear with a baby scorpion.

The Bishari are truly survivors. It is quite possible that they are descendants of the nomadic tribe called the Buka, recorded in Egyptian hieroglyphs dating back to 3000 B.C. The Buka were later known to the Romans as the Blemmyes. The Bishari were most recently documented by various British anthropologists and adventurers during the British administration of Egypt, and several fascinating theories about their origins were published in the first quarter of the century. In some of these publications the Bishari are taken to be a Hamitic people who crossed the Red Sea from Arabia at a very early date. Many modern anthropologists theorize that they are African nomads who have wandered north. Fawzy subscribes to a third theory, that these people are actually "living" ancient Egyptians, and she is not the first to note the striking resemblance to pre-dynastic Egyptians.

The Bishari women have continued to plait their hair in thin braids in the style of the ancient Egyptian women, and their jewellery is marked by pharaonic design. In the more remote mountain tribes the women are bare-breasted, and covered from the waist down by a sheath of material (*shoga*) like the women of Pharaonic Egypt.

After twelve years living among the tribe, listening to the tales they have passed down through their oral tradition (*To Bejawi* is an unwritten language), Shahira Fawzy believes it is possible that these people are "descendants of ancient Egyptians who were brought out by the Pharaohs to guard the Eastern Desert gold mines, who were simply forgotten, and who were then cut off from the world at the time of the Ptolemies."

Gold was discovered in the Eastern Desert mountains as early as 3000 B.C. During the early Middle Kingdom, around 2000 B.C., the first mines were worked, and this period documents the first known portrait of a "Bejawi," represented on a XIIth dynasty tomb chapel at Meir in Upper Egypt.

The abandoned mine at Wadi el Alaqui is a bleached, eerie graveyard of crumbled walls and shafts that feels haunted by ghosts of the slaves who worked it. The mines were opened by Pharaoh Seti I in 1300 B.C. When the nomads told Shahira about Alaqui, they explained that "it was their duty to guard the mines." Referring to tales from their oral history, which tends to confuse past and present, they told her that "the mines would be impossible for her to find without the map, but the map was now in the hands of the Romans." Astonishingly, one of the oldest maps in the world is a papyrus that experts believe marks the gold mines of Alaqui, and the "Romans" really do possess it—it's on exhibition in Turin, Italy.

Myth and folklore have created an impression of the Bishari as warlike, fearsome tribes. Their isolation has encouraged this image, and their warrior tradition is hardly in doubt. Today the men of the tribe still sport daggers and swords like those carried by the Crusaders, which are passed down from father to son. Their sword dances and songs recall battles with the many outsiders who came to the desert to exploit them. Nearly eight hundred years after the Pharaohs abandoned Alaqui, the Ptolemies sent their armies to search for gold. In 30 B.C. the Romans sent legions to search for the lost gold and for marble. Then, at the turn of this century, the British came to reopen the mines. Their attempt was short-lived; after twenty years Alaqui was again abandoned. In such remote, hostile terrain, in temperatures that can soar to 50°C, the quest for gold quite simply became too costly in money and lives.

Despite the rise and fall of civilizations around them, the self-proclaimed guardians of the mines have always maintained a way of life that has remained virtually unaltered by others. They ignored or dismissed the Arab influence, preferring to practise a form of Islam mixed with desert mythology. Egypt's

industrial revolution, colonial period, and technological revolution have passed them by. Today, as we ponder Star Wars, they live in another age. In their uncharted land, time is measured differently; a day stretches out as endlessly as the terrain. An old man tells us that he was born "long ago." When we ask about his mother (who appears to be more than a hundred) he tells us she was born "lo-o-o-ong ago." There's no way of knowing the natural life span. For the once warrior tribe, the only enemy today is the environment.

Distance, too, is measured differently; step by step under a blazing sky. The nomads walk about thirty-five kilometres a day. At one uncharted, remote camp we learn where we are: a forty days' walk to the sea. Having learned to exploit every possible resource on their migratory routes, the Bishari slash and burn dry sayalah and sont trees that line the desert valleys. From this they make charcoal for their own use and to trade. They also collect roots to supplement their diet and herbs, which along with animal organs, are used for healing. The boys learn to hunt from an early age; a *bersh* lined with animal skins is a sign of prestige. They are adept at leather making; with finely braided designs they adorn their camel saddles and make leather buckets, water bags, and straps for hanging utensils such as the ostrich eggs they use for containers.

Green grows the desert

Shahira Fawzy is currently completing her doctorate in anthropology at Britain's University of Manchester. Since 1977 she has spent extensive periods of time living among the Bishari and Ababdah nomads of Egypt's Eastern Desert.

When she first encountered the nomads they were suffering the effects of an ecological change that was threatening their existence: the construction of the Aswan Dam, which had flooded their only permanent pastureland. As they had previously experienced torrents of rain that had occasionally flooded the region, they decided to wait for



Shahira Fawzy first encountered the Bishari in 1975.



A Bishari works one of the gardens cultivated by the nomads since some of their pastureland was flooded by the Aswan Dam.

the land to dry, as it had in the past. When they finally realized that this flood was not temporary, their animals were already too weak to make the seasonal journey back across the desert; many died. The nomads began to crowd the few permanent wells in the desert, and some were forced to move to the desert fringes near Aswan.

In 1981 Shahira Fawzy began a small-scale development project for the tribes. Using indigenous materials and appropriate technology, she helped the nomads to create a chain of wells and gardens along their migration routes between the Nile and the Red Sea, giving them an alternative to their lost pastureland.

Camels are essential to the nomads, providing transportation and milk that is the basic component of the Bishari diet.

Facing page: This young girl will be taught the centuries-old traditions of life in the Eastern Desert. It is unlikely that she will ever travel away from the desert or even visit the small settlements on the desert's edge.



Camels are the primary source of wealth, prestige, and social status among the tribes. Camel milk is the mainstay of the Bishari diet, and the Kiliwan camel, which they raise, is considered the fastest camel in world. It is able to run twenty to twenty-five kilometres per hour and is much in demand throughout the Middle East. Upon their initiation at age twelve or thirteen, the Bishari boys are given a sword and dagger and a camel of their own.

The young girls are given a goat or sheep to herd. Goats and sheep make up the rest of the Bishari wealth, and are owned and tended by the women. Women, Shahira found, have great freedom, power, and respect, a fact which leads her to believe that this was once a matrilineal society. Women own the *bersh* and have complete control over it. They are allowed pre-marital sex, and illegitimate children are reared by the mother's family and are not denied any rights. Shahira was told by a group of Bishari men, "Women enjoy sex and cannot be blamed for it. If a married woman has sex with another man she cannot be punished, but her husband will charge the offender to pay in camels the price of his deed."

Still the rules that govern marriage remain strict. The first cousin on the father's side is the most eligible suitor by tradition. Dowry is paid by the men and must include gold or silver wedding jewellery and at least two camels and a few goats. The more distant the relative, the greater the dowry he must pay. Weddings and births are celebrated with the slaughter of animals and feasting.

With such small means, the nomads slaughter only on special occasions. The normal diet is milk and flour (for which they trade) mixed with different kinds of roots and desert herbs. Between the two main meals of breakfast and dinner they pause for *gabana*, which is coffee mixed with *gozt el tib*, a mixture of ginger and herbs, commonly known as *keif*.

Because of the severity of the environment, laws of the desert govern the conduct of all people. One example is the "honesty of the tree." Before migrating, a family may tie some of its possessions to the branch of an acacia tree, to be reclaimed upon return. These possessions, which can be spotted throughout the desert, are never touched. This is partly because it is believed that anyone taking another's belongings will be cursed, and partly because the tribes have long since learned that they are united in a tenuous balance with the environment, and that if the balance is upset, they will all die.

Hospitality is another law of the desert. Everywhere one is welcomed into a campsite with offerings of *gabana*, water, and food. After a visitor settles into a choice place in the shade, there is a happy and very necessary ritual

Before a family migrates it may tie some of its possessions to the branches of an acacia tree, where they will remain until the family returns. While waiting for the journey to begin a goat gets some relief from the desert heat in the shade of this very loaded tree.





The warrior dance is an exciting reminder of the Bishari's past.



exchange of news about births, marriages, deaths, and other social events. This is followed by a crucial discussion about the rainfall: where it can be found, the number of days' distance by foot, the number of other people going there, and the number of animals that can be watered. False information is unheard of; it could mean death.

Even the strange nomads from Canada were invited to share the Bishari's meagre resources, and again and again, to join their gatherings. We were entranced by the long, melodic ballads sung around the evening campfires.

The Bishari seemed happy but not surprised to see us on our second and third visits, despite the fact we had been away almost a year each time. Being nomads, they simply assumed that, like themselves, we had been travelling through the desert. One moonlit night, the men in our film crew were offered swords and invited to join the warrior dance. As they tried to imitate the tribal leaders by wielding the swords up towards the night sky, we were named the Toronto tribe.

When I think of the Bishari now, I remember one morning, just after dawn in early July. The men had left the camp, and the women had first finished the herding and then had returned to prepare breakfast. It was the productive time of the day, before the heat became unbearable, and there was a buzz of activity throughout the camp. As the women chatted with Shahira, there were great gales of laughter, teasing, and the exchanges of news. A young mother sat weaving, singing as she worked. We stood back, ready to begin filming again, but sorry to have to remove ourselves from this intimate scene. Out in the middle of nowhere, in this godforsaken wasteland, these people had distilled life to the very basics. There was joy—simple, refined—at the early morning breeze, the visit of a friend, the chance to chat while the men were away. In our quest for a meaningful and prosperous existence back in “civilization” I wondered how much we had lost. When I think of the Bishari now I picture them as they were that morning: tough survivors taking pleasure when it was afforded, living in their own time and place, a proud and simple people of this ancient land. ☸

Shelley Saywell is a freelance film maker and author based in Toronto. With Debby Parkes she produced the film Shahira, which won the award for best documentary photography from the Canadian Society of Cinematographers.

THE SECRETS OF EDGAR DEGAS



*An open letter
of appreciation*

Harry Rasky

Dear Edgar,

I love your paintings. Your colours haunt me. They dance through my mind in startling greens, perfect pinks, and live reds. I long to embrace you as years ago I might have wished to hold one of your more darling dancers. Yet you puzzle me.

I will not pose as an expert. Not long ago I heard an expert described as "someone from out of town." And someone else added "the one carrying the briefcase." I come loaded with no such baggage. I never studied art or art history. But I do seem to have a feel for the heart of an artist, and the making of films about the creative force has become my lifework.

Some three years ago you were brought to my attention over breakfast at the Stanhope Hotel restaurant, in New York. Karl Katz, the energetic head of the Office of Film and Television of the Metropolitan Museum of Art, made me an offer I could not refuse, and that was you. The possibility of climbing into the frames of your paintings and wandering through your life for a couple years was too delicious a project to refuse. I was fascinated by more than the works for which you've become famous – scratching and pulling dancers, caught by surprise backstage, or horses breathing the early morning

Paris air. The tension of your very complex portraits still makes me twitch with anxiety. Your restless spirit won't let me sleep.

After my New York meeting I began my search for your secret self with a walk through the crowded galleries of the Met. Then I started to read through the endless art books: repeated facts, half truths, and pounds, no, tons of opinion. Not for me. I wanted your art to speak directly to me.

My first major stop with a film crew was San Francisco, where we saw a marvellous exhibition that had come from the National Gallery in Washington. It was called *The New Painting - Impressionism 1874-1886*. That your work had the most diversity was immediately apparent. Although one could have danced all night with Renoir and his full-fleshed beauties, and swum in the dazzling ripples of Monet, from room to room I could see you observing; you are always the observer. I wished that I could also roam around your figures caught in their characteristic poses.

Your famous painting, *Portraits in an Office*, may seem to some like an early *Saturday Evening Post* cover. A critic of the time commented: "His painting of the *Cottonniers* is astonishing, accurately capturing the suffocating atmosphere of the office, summing up all of American civilization." However, you responded with your criticism of critics: "Oh the critics, they won't leave you at peace. Paintings concern one's private lives." For me, your remark confirms that you were always trying to portray people caught in their own solitude.

My investigation took me to Paris, of course. Many of the books referring to your birth talk of an affluent, upper class start; however, I discovered that this wasn't quite the case. The ninth *arrondissement* of Paris, which has been aptly called Degas country, has always been a real mix of middle class and mundane, although now 154 years after your birth, this mix is represented by pizza and pornography. Many of the great people I have known have come from this kind of background but the difference is that your family signed its name De Gas, as if descended from land-owning aristocrats rather than from a grandfather, Pierre Degast, a provincial baker. The fact that your father was half Italian and your mother Creole from New Orleans may have made you feel somewhat the outsider. The elite school that you attended, Lycée Louis-le-Grand, still stands across from the Sorbonne. It's remarkable that your sketches did earn a third honourable mention, but never a prize.

It was in Italy, where you travelled to copy the masters, that your passions and power began to display themselves in early portraits. A cold passion. A lonely passion. In your writing at the time you reveal the inner torment that dominated your thinking and your work: "There is a sadness that is the lot of anyone who takes up art. There is an emptiness that even art cannot fill." You suggest that you might have even considered taking a wife, "a good little wife" as you said. But I think your shyness and even fear of what my friend Tennessee Williams was later to refer to as the "tyranny of women" had set in. Much later in your life you were asked directly and responded, "I, marry? Oh, I could never bring myself to do it. I would have been in mortal misery all my life for fear my wife might say, 'That's a pretty little thing,' after I had finished a picture." But even so, you seem to have been plagued by loneliness. You said, "I think one could put up with even dogs and flowers rather than have to endure solitude."

I think painting allowed you to worship women, even if it most often was from a dis-



Above: *Portraits in an Office* (1873), oil on canvas, 73 x 92 cm, Musée des Beaux-Arts, Pau.
 Below: *Dancer Resting* (1879), pastel and gouache on laid paper, 59 x 64 cm, private collection.



tance. A third of all your paintings are centred on the ballet. And yet not more than half a dozen lines in your numerous notebooks tell us why. You say, "In ballet I find the combined movement of the Greeks." But still you frustrate me as to why so much of your life was involved in the ballet. The critics made much of "a vulgar awkwardness about some of the pink legs." You caught the dancers off guard in inelegant poses before the artificial beauty began, as if to say: most life is earthbound, especially at the edge of an operatic aria. Your dancers yawn, and scratch, and plop. And yet you make me anxious for the dance to begin. You say: "The dance was an excuse for me to draw." I want to know more. In the later pastels, when your sight was dimming into darkness, I felt the most passion, the most freedom, as if at last you painted directly from your heart.

Movement fascinated you. Your many horses on canvas are also proof of that. But once again, not a line exists where you detail a fondness for horses. No one seems to know if you ever rode a horse. But in your works the speed, the rush, the breath, and the whole social world surrounding the race course at Longchamps can be felt.

You also portrayed your women and horses in sculpture but you never allowed these works to be exhibited; they were a revelation for those who visited your studio. Renoir is reported as saying, quite impatiently, "Why, Degas is the greatest living sculptor. You should have seen the bas-relief..., he just let it crumble to pieces." Why?

The Little Dancer of 14 Years still moves those who see her. In some ways this piece was the first mixed media art. There she stands grandly, impudently, with her hands proudly behind her back, defying all the known rules of your time. A real bow in her sculpted hair; a real skirt around her molded torso. It's no wonder a critic said: "At the first blow he overthrew the traditions of sculpture just as he had long ago shaken the conventions of painting." Why did she fascinate you so, and now why us?

You are a challenge. You reveal so little. At night I've gone to bed arguing with myself about a picture sometime called *The Rape*. I filmed it first in Philadelphia. Some call it *The Quarrel* or *The Dispute*; you seem to have preferred *Interior*. I anticipate the next moment, feeling as if I should call for help. Let every artist, photographer, and film-maker study this painting to learn about light. You advise us

yourself, "Work a great deal on night effects - lamps, candles, and so on. The provocative thing is not always to show the source of light but rather its effect."

No painter was ever a more perfect observer. Your double portrait, *Absinthe*, has since influenced every painter of bar scenes. Once again there is that agony of human solitude. You wrote of despair, "You have moments like these when you would slam yourself like a door. You would suppress everything around you, and once quite alone you would annihilate yourself, kill yourself with disgust... I piled all my plans in the cupboard for which I myself always carried the key, and I've lost the key."



Horse Balking (1888-90), bronze, 28.4 cm high, private collection.

You became the Impressionist of the night. Those brothel drawings have the heavy, ripe odour of cheap perfume and biting liquor about them, but also a cynical humour. It was Picasso who bought them all to study and to enjoy, so I had to go to the Picasso Museum in Paris to see them.

But it's the bathing beauties – the women in tubs – endlessly towelling themselves and caressing their hair, who seduced your senses in your later years. The critics referred to "lucid and controlled ardor...icy fever...intense and muffled colouring...mysterious and opulent tones." Yes, it is all there. The colours are the most vivid of your lifetime – breathing, an intense breath of life.

You described these magnificent forms as the "animal taking care of its body. A female cat licking herself." Vivid, but still mysterious. You said, "You know that beauty is a mystery. No one knows it anymore. The recipes, the secrets are forgotten."

You were also the master of the snapshot, if not its inventor. Your early photographs suspend time, leaving those who view them to wonder and to want more. With your constant, relentless, curious eyes that mixed so perfectly the mundane with the magic and the magnificent, you would have been a master of documentaries.

But your healthy, often-expressed contempt for the peskiness and poverty of imagination of jealous critics would have grown as they would have become more intrusive and hurtfully personal. And you perhaps would agree that anger is the enemy of every creative artist if diverted from his personal search for truth. So perhaps it all ended at the right place and time, even if there is something still so sadly incomplete about your massive skill and still secret passion.

Too many years of observing, too many years of looking at life. You wrote, "There is even something artificial about my heart. The dancers sewed it up in a pink satin bag, a slightly faded pink satin, like their ballet slippers."

The journey your mind travelled leaves me ever curious and wanting to know more about you, more about your painting. You wrote: "The real traveller is the one who never arrives."

You have given all who know your work beauty, you have teased us with mystery, haunted us with puzzling portraits, excited us with new ideas. But then, as a person you shocked and disappointed us. Your personal life was a disaster. As the last century drew to a close you turned against your closest friends. The issue was the Dreyfus affair.

To quote the 20th-century philosopher Jean-Paul Sartre, "Anti-Semitism, is a free and total choice of oneself, a comprehensive attitude that one adopts not only towards Jews but towards men in general, towards history and society; it is at one and the same time a passion and conception of the world."

The creative colony of Paris was at war with itself. Whereas Monet, Pissarro, Proust, Anatole France and, of course, Zola supported Dreyfus, you were the most vocal of a group against him that included Cézanne, Renoir, Rodin, and Rouart.



The Little Dancer of 14 Years (1879–81), wax, cotton skirt, satin hair ribbon, 95.2 cm high, private collection.



Above: *The Rape* (c.1868–69), oil on canvas, 81 x 116 cm, Philadelphia Museum of Art.

Below: *Nude Woman Drying Herself* (c. 1890), pastel on paper, 55.5 x 70.5 cm, Philadelphia Museum of Art.



Worst of all, it caused a break with your warmest friend, Ludovic Halévy, who had long ago converted to Catholicism. Your friendship dated back to those schooldays at the Lycée Louis-le-Grand. You dined with the Halévys at their home each Thursday. They were really your adopted family. But then abruptly at dinner one night, in 1898, you exploded in an anti-Jewish tirade, and you never saw Ludovic alive again. As a colleague once said about you, "Politics in the Degas Style were inevitably like himself - noble, violent, impossible."

Ah yes, impossible!

And yet...

There is the episode written by Daniel Halévy, Ludovic's son, in an extraordinarily intimate little book called *My Friend Degas*. Ten years after the fateful dinner, Ludovic Halévy died. You, almost blind, entered the home for the first time since the dispute to pay your respects. The room was dark. You looked at the body of your old classmate and clamoured for "Light, lots of light." After a time alone with your dead friend you said, "This is indeed the Halévy whom we have always known with the additional grandeur that death gives. This must be kept - recorded!" But you were now too blind to paint what you felt.

This past summer I had the opportunity of observing your collected works at Canada's new crystal palace, the National Gallery. It was like a meeting of the clan, 280 works assembled from all over the world. It occurred to me that even you never saw such a display, having sold your works off as they were created. Four nights in a row I observed.

Not long ago, in a splendid review of the Ottawa show, John Russell, the excellent art critic of the *New York Times* wrote: "Degas never wanted us to be sure of what he was up to. 'A painting should keep a certain mystery,' he liked to say, and to this day no one knows for certain what is going on in his finest paintings. And what is more, nobody ever will."

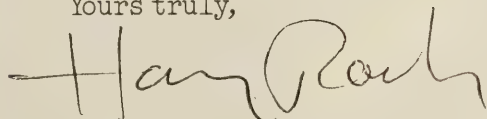
So that is what we have come to. Ambiguity.

You will forgive this unorthodox method of commenting on your work and you, but as a film artist, I believe that no artist ever really dies. You yourself said, "Painting concerns one's private life. One works for two or three friends who are alive and for others who are dead or unknown. I think that literature has only done harm to art."

Words say so little. So that is it for now. With deep appreciation (if not full affection).

Your art is your response.

Yours truly,



Harry Rasky, Toronto, 1988

Harry Rasky is well known for his outstanding film portraits produced by the CBC. His most recent portrait, Degas: The Film, was produced by the CBC in association with the Office of Film and Television of the Metropolitan Museum of Art and Radio Canada to accompany the exhibition Degas, jointly organized by the Réunion des musées nationaux of France, the National Gallery of Canada, and the Metropolitan Museum of Art in New York.

The Story of Dough



The smell of good bread baking, like the sound of lightly flowing water, is indescribable in its evocation of innocence and delight.

M. F. K. Fisher

IT'S toasted for breakfast, spread with peanut butter and jelly for the children's lunch, converted into croutons for soup. Supermarkets stock a perplexing choice: sliced white and brown, crusty Italian, Hovis, raisin, light and dark rye. Specialty stores provide still more, everything from Portuguese *broa* to Scottish baps and French *pain de campagne*. Bread. The average Canadian eats about thirty-seven loaves a year, which gives a total of more than 930 million for the nation as a whole, plus hundreds of rolls, bagels, croissants, and related baked goods. Where on earth does it all come from?

For the most part, from commercial bakeries, since very few people today have either the time or inclination to manufacture the staff of life for themselves on a continuing basis. Giant operations such as Weston Bakeries Limited can turn out 150 000 loaves a day from just one Toronto plant, and that one by no means their largest. In addition, Weston's produces frozen dough for in-store bakeries, and partially baked loaves that will allow even staff-shy small stores to offer the tantalizing aroma of fresh bread without a major investment in labour or equipment.

The curious thing is that the high-tech world of commercial baking still has quite a lot in common with the way grandma used to do it, for bread, despite all the refinements, additions, and changes it has undergone over the years, is still at base a mixture of flour, liquid, and leaven, often with some salt, sugar, fat, or flavouring thrown in.

For such a homely substance, bread occupies a peculiarly vital position in grain-growing cultures. More than any other food, it has come to symbolize the essential sustenance, equated with life itself. "Give us this day our daily bread" finds its echo in many traditions.

Considering this almost mystical property, perhaps it's appropriate that no one knows for certain which early ancestor realized that the tough grain of wild grass could be pounded and mixed with water to form food. For a long time these pastes were eaten raw, a sort of forerunner to our porridge. Then, probably by accident but possibly by design, a dollop of paste was spread out on a stone under the hot sun or beside the fire, and unleavened bread was born.

The next step, if such a fortuitous progression can be said to have had clear stages, occurred when some paste was made but not immediately baked. Airborne wild yeasts floated in, found a compatible environment, and began to ferment. Once this mixture was baked, the difference in texture and flavour was instantly apparent. Our curious and innovative forebears must soon have learned to make deliberate use of this natural phenomenon, and eventually to save some of the leavened dough to add to the next batch to ensure its rising, a practice which survives to this day in sourdough starter. This was a crucial discovery. Now breadmaking no longer depended upon pure chance.

Today when we think of bread we tend to think of wheat, but that was not the only or even the first grain to be utilized. Barley, rye, corn, millet, and oats have all played a part (and indeed still do, although almost always as an adjunct to wheat). Wheat, in particular hard wheat, is special because it's the only grain whose flour forms a strong gluten. As Walter Banfield, an English master baker, wrote some fifty years ago, "This gluten is important because when developed it forms the skin of myriads of tiny balloons which hold the gas produced by wheat activity. If the gluten were not formed in dough any gas produced would simply escape and the dough could not be

No matter how vast the production, bread today is still made the old-fashioned way

Gloria Varley



Facing page: Grano, a North Toronto bakery and restaurant, presents an appetizing array of breads for a local clientele.

Above: Weston Bakeries Limited supplies bread to the nation. The Dupont Street plant can produce 150 000 loaves of bread per day, and that is not even Weston's largest plant.

Bread in ancient Pompeii was baked in rows of outdoor ovens.

Upper: The Romans developed the means for individuals to grind greater quantities of grain at one time.

Lower: The ancient Egyptians rolled a heavy bar over the grain in order to grind it.



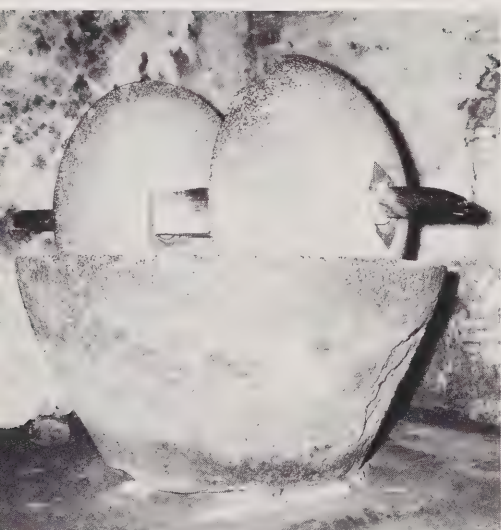
PHOTOGRAPH COURTESY ART RESOURCES

aerated or made light.” The wheat berry has been called a complex little storehouse of food, and indeed it is. The germ or embryo, which will sprout to start a new plant, forms only two per cent of the grain, but it is particularly rich in proteins, vitamins, and oil (hence the popularity of wheat germ as a so-called health food). Eighty-five per cent of the grain is the endosperm, its starchy heart (from which the gluten is formed), and the rest is made up of the protective fibre-rich outer coating of bran.

Raised bread seems to have developed in Egypt around 4000 B.C., coincidentally with the appearance of a type of wheat that could be easily husked. Previously, wild wheat had to be toasted before its outer coating could be removed. Thus parched, it was crushed with a mortar and pestle and some of the chaff was separated from the grain. But heat applied before the glens come into contact with yeast makes them unable to respond to its action. Bread baked from this crude flour would have been no lighter than a common barley loaf. The new strain of wheat solved this problem, although it was a long time before leavened bread became the mainstay it is today. In the Middle Ages it was still uncommon, and 16th-century sailors survived on hard tack, a flour-and-water dough baked and dried so hard that it defied breaking, let alone chewing. (On long voyages weevils helped a bit by perforating the rock-like slabs.) Even in 18th-century Europe bread was often baked no more than once every month or two. The bread would grow so tough and mouldy that it sometimes had to be split with an axe.

Through the centuries, improved milling methods gradually increased flour production. The saddle quern, probably developed in Egypt, is the mill referred to in the Bible. The miller—usually a female slave—knelt at the highest side of this simple sloping stone and crushed the grain against it with another stone that resembled a rolling pin. Around 800 B.C. an hourglass-shaped mill was introduced that could be turned continuously in one direction by means of a long horizontal bar, with either humans or animals supplying the power. The development of ridged circular millstones, such as the Romans used, made it possible to put wind and water to work grinding grain, and those systems persisted in various forms until the Swiss invented the steel roller mill in the middle of the 19th century.

Given a ready supply of the right sort of wheat and an efficient milling process, reliable leaven and dependable ovens are the other essentials for good bread. Before it's baked, bread dough—like yogurt, wine, beer, and other fermented foods—is alive with yeast, a kind of single-celled fungus. One handy species, *Saccharomyces cerevisiae*, can both leaven bread and convert grain and grape carbohydrates into alcohol, lending the products a characteristic “yeasty” flavour. In bread dough, the yeast feeds on sugars which release carbon dioxide. This in turn stretches the elastic glens, causing the dough to rise. Different forms of yeast, dry or compressed for instance, react in



PHOTOGRAPH COURTESY ART RESOURCES



PHOTOGRAPH COURTESY EGYPTIAN DEPT., ROM



In less than thirty minutes, the modern ovens in one Weston Bakeries Limited plant can bake hundreds of loaves of bread.

somewhat different ways and even require different temperatures for optimum performance, all of which adds a certain degree of mystery to the breadmaker's ancient art.

Ovens evolved from bell-shaped clay coverings for dough baked on hot stones to the arched brick structures uncovered at Pompeii, which closely resemble many employed in Europe and North America up to this century. (Indeed, some are still utilized in a limited way, their owners being convinced that the old ovens give a flavour and crust superior to modern gas or electric models.) Convection ovens, in which fans keep hot air constantly circulating, are the newest technology for both home and commercial use.

Despite basic similarities to home production, large-scale breadmaking today is impressive simply because it *is* so vast. At Weston's, for example, the sponge method—familiar to any home baker—is still employed. This is slower than the straight dough method (in which all ingredients are mixed at once and ascorbic acid is used as an accelerator), but the sponge method's slower rising gives better flavour development. First, sixty per cent of the ingredients are mixed with the yeast and allowed to ferment. Then the remaining forty per cent go in and the dough is remixed for eight to twelve minutes by blades which whirl and toss it so enthusiastically that gobbets fly out to spatter unwary bystanders. From start to finish, the process takes about eight hours—just as it would at home—but the quantities are enormous. Computer-controlled flour storage silos hold 20 000 kilos each, ready to be blown down ducts to the mixing room. The dough rises in loaf-pan-shaped bins far bigger than bathtubs.

After a short rest to let it relax, the dough starts its transformation into loaves. Down a conveyor belt it goes to where uniform pieces, by weight, are shorn off and plopped into nest-shaped depressions on what looks for all the world like a baker's ferris wheel. After its ride, the dough swings round to be deposited at a set of gentle mechanical rollers that squeeze out large air bubbles. Then each piece is shaped, and dropped into an individual baking pan. Proofing is the final step before baking. Allowed to stand in a controlled environment of 105°F (40°C) and about ninety-five per cent humidity, the dough rises to the top of its pan. Then it's into the oven—at a temperature of 450°F (232°C)—where the dough rises still more in the first seven or eight minutes. (This is called "oven spring," and produces a nicely rounded top.) After another sixteen to twenty minutes the bread is conveyed out from the other end of the oven, where suction cups gently lift each loaf from its pan onto a rack for cooling.

Next comes the slicing machine. Bread is sterile coming out of the oven, but these blades pierce right to the centre of the loaf and could carry contaminants with them. To prevent this, eerie ultraviolet light bathes the blades to keep them sterile. In another moment a plastic bag puffs up, the

Top: Bags of flour are emptied into huge mixers at Weston's. As in any large factory safety precautions—hard hats, boots, and ear plugs—are mandatory. The mask worn by this worker prevents him from inhaling too much flour dust. *Bottom:* Although this quantity of rising dough is far greater than what is produced at one time in the average household, it is still deflated by hand with a few good punches.



slices slide in, and the bag is secured with a dated, colour-coded tag. If it is not sold within five days it must be removed from the stores, although loaves still in good condition then are usually reduced for quick sale.

The time limit is imposed by the lessening use of additives, among them preservatives, in breadmaking today. This is a subject guaranteed to raise controversy, and sometimes tempers, for both pro and con sides of the additives argument have powerful emotional appeal. The "cons" decry additives as chemicals, perhaps forgetting that so is all food and, indeed, the human and other animals who consume it. More to the point are those scientists and consumer activists keen to test additives for harmful qualities and eliminate the ones without any overriding benefits. Meanwhile some "pros," at least as shrill as their harshest opponents, preach the more the merrier, as if bread should last unchanged forever. But the rational "pro" argument notes that, technically, sugar, salt, baking powder, and flavourings are all additives too, and seeks to find a decent balance between the benign and the malignant.

As usual in human affairs, the truth seems to lie somewhere between the two extremes. Vic Ursaki, recently retired manager of the bakery division at Weston's, worked hard during his thirty-eight years with the firm to have additives reduced. "One of my campaigns was, get rid of the crap," he explains. "And the bread hasn't suffered; it's better." Any preservatives that remain are essential in an industry that produces bread in centres many kilometres from its markets. Even given the efficient network of transport trucks that haul the loaves baked in Toronto today to Sault Ste. Marie by tomorrow morning, a little boost to freshness-inducing, mould-retarding properties doesn't hurt.



Top: A batch of dough is spun out of the mixer into a bin that looks much like a small open train car.

Bottom: Uniform pieces of dough are carried in nest-shaped depressions on a veritable baker's ferris wheel to a series of gentle mechanical rollers that squeeze out large air bubbles.



While remaining alert for additives that aren't healthy, though, modern consumers might spare a prayer of thanks that the good old days are past when alum, plaster of Paris, or even (it was whispered) ground-up human bones were stirred into the dough to increase volume or improve the colour.

For ages, whiter loaves have been coveted precisely because they are harder to produce and therefore costlier, and so enhance the social status of those who can afford to serve them. Commoners might feed on heavy stuff where the grain was but roughly separated from the chaff (not to mention assorted straw, twigs, and bits of stone). Their betters could and would pay for finely milled white flour. Because it's been part of folk wisdom that the rougher, chaff-filled, fibrous bread in fact provided superior nutrition, it's surprising to consider later research which sets this dictum in a somewhat different light.

As early as 400 B.C., Hippocrates observed that bread made with the bran was more laxative, while bread made from flour that had been cleaned of the bran was more digestible. It turns out that he was largely right. Fibre is necessary for human health, to be sure, and whole grain flour contains more proteins, minerals, and vitamins than refined. The trouble is, many of these nutrients pass through the digestive tract unabsorbed because indigestible carbohydrates bind with them and speed their passage. In white breads, the nutrients don't suffer this fate. Given a normal balanced diet, the difference is probably so small as to be negligible: it's perfectly safe to eat whichever one prefers. But for marginal diets, whole grain breads can be very harmful. During the Second World War, serious outbreaks of rickets were recorded among Dublin schoolchildren because the natural phytic acid in whole wheat

Grano's kitchen is no larger than the average house kitchen; baking is conducted in about half the space and other food preparation in the remaining space. Here Rick Antonucci shows off several loaves of bread that have just come out of the oven, while Frankie Abate, the head baker, busily prepares the next batch of bread rolls for the oven.



bread made the calcium in their scanty dairy rations unavailable. Other problems of iron and zinc metabolism have been reported among the whole-grain-eating poor in Egypt and Iran.

Before any backlash against brown bread occurs, remember that "marginal" is the key word. Most people fortunate enough to be able to make food choices based on taste can be confident that their nutritional intake is quite sufficient for good health and so can happily take advantage of the many specialty bakers who now supply a delicious range of breads to supplement the commercial bakeries' production.

There are no flour silos or conveyor belts at Grano, a North Toronto bakery-cum-restaurant. The bread is produced in a space smaller than many suburban living rooms. The owners, Lucia Ruggiero-Martella and her husband Robert, have no formal training (he's a liberal arts graduate, she majored in anthropology and psychology), simply boundless enthusiasm. They cherish their shared Italian heritage, love good food, and believe in high standards for whatever they do.

Two years ago they set about duplicating many of the typical Italian breads they'd discovered in their travels, gradually adding their own specialties to the list. Today they employ one full-time baker and two part-time assistants to turn out from 250 to 500 loaves a week, along with 170 dozen buns. There's crusty white bread with a split top, heavy multi-grain loaves, rings of Calabrese bread, and crescents of Sicilian. They experiment by adding pesto, black olives, and a puree of sun-dried tomatoes, but not with any accelerators or preservatives. Their breads are meant to be eaten right away. Leave a Calabrese on the counter overnight and you'll find out why so many hearty Italian soups call for chunks of dry bread in the bottom of the tureen. It's the only way to soften the still-delicious leftovers.

The way Grano makes bread is hands-on and labour-intensive. Ruggiero-Martella laughs that they stepped into the 20th century this past year when they added one new piece of machinery to their battery of mixer, proofer, and ovens: a divider that cuts a circle of dough into thirty-six little balls, then rounds them up for rolls. Before, the dough was divided by hand, weighed, then shaped, and some of the irregularly shaped rolls and all the breads are still made this way.

Small-scale baking of this sort is inevitably time-consuming, expensive, and geared towards a somewhat sophisticated market. Its comparatively low production could never supply the wants of a whole society. Large-scale commercial bakeries, by contrast, can offer economy, consistency, and volume, yet of necessity their products often lack individuality, at least partly because their customers tend to insist on the familiar. Fortunately for our crowded urban world there's no need to choose one over the other. Large and small both have important roles to play. ☺

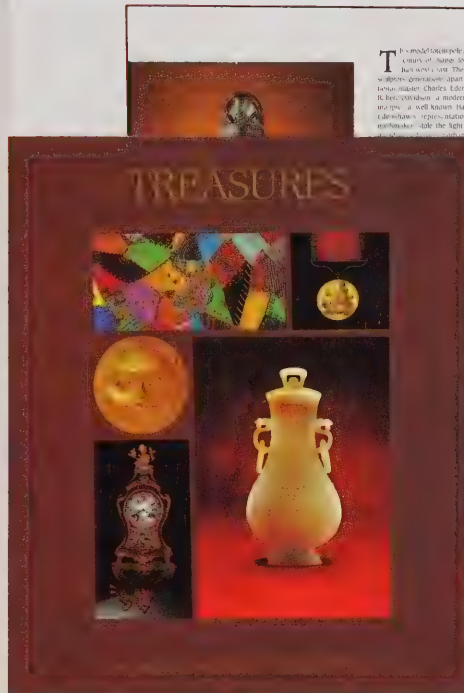
Gloria Varley, a regular contributor to Rotunda, writes about food for several publications including Toronto Life.

SEASON'S READINGS

TREASURES;

The Canadian Museum of Civilization.

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The model (copper and gold-plated) is, like the original, a century old. It was made by the Haida people of the coast of British Columbia. The model was made by two miniature sculptors, generations apart within the same family, each from a different Haida village. The model is a work of art, a well-known Haida narrative. Beginning with the Haida's origin, it tells of how Haida, the great grandfather, stole the light that his grandfather, the great grandfather, stole from the sun. The model is a work of art, a well-known Haida narrative. Beginning with the Haida's origin, it tells of how Haida, the great grandfather, stole the light that his grandfather, the great grandfather, stole from the sun.

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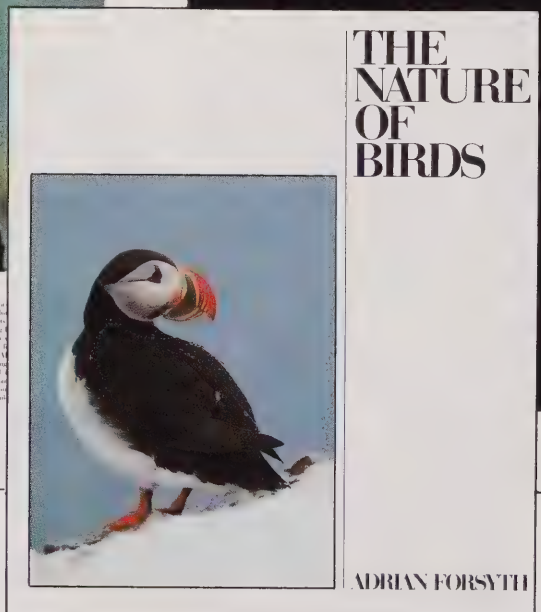
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that are, in fact, a small part of a much larger world. The book is a guide to the world of birds, explaining how they have evolved to cope with a complex natural world. Over 100 superb colour photos. A beautiful and informative gift, \$19.95.



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DESTINATION MARS

*Financial risks aside, what is
the real price of a manned
expedition to Mars?*

Richard Longley

THE space age is about to enter a new era. Early in 1989, the Soviet Union will send two unmanned Phobos probes to survey Mars and the larger of its two tiny moons. If the mission succeeds, it will signal an expertise in electronics, robotics, and communications that must puzzle the citizens of a nation that seems incapable of producing a marketable home computer or a reliable television set. It will also mark, nearly thirty-two years after the October 1957 launch of *Sputnik*, the beginning of the realization of the science fiction writer's dream—human exploration of the red planet. Before this can happen, however, Soviet scientists must determine whether or not the human body can withstand two to three years' exposure to the weightlessness, cosmic radiation, and utter loneliness of the space environment. They have already made a good start.

Although the U.S. space program has been all but grounded since the shuttle *Challenger* exploded and fell into the sea in January 1986, the Soviet Union's program has never been more active. The U.S.S.R. has launched more than 2000 spacecraft since *Sputnik*—more than twice as many as the rest of the world combined. Since the flight of Yuri Gagarin in 1961, cosmonauts have ac-

Portrayed against a backdrop of stars are the American team of the space shuttle *Columbia* (above) that spent 10 days in space in 1983 and the Soviet Union team that spent 237 days in the *Salyut* space station in 1984.

PHOTOGRAPHY COURTESY NASA

PHOTOGRAPH COURTESY THE U.S.S.R. EMBASSY IN CANADA



The cosmonauts were removed together with their chairs from the spacecraft. The strain of their journey and the effects of gravity after weeks of weightless conditions left them too weak and tired to stand.



PHOTOGRAPH COURTESY THE U.S.S.R. EMBASSY IN CANADA

accumulated more than 5000 days in space. The U.S. total is less than 1800 days, a figure that has not changed since 1985. More important is the individual experience of the cosmonauts. While no Westerner has spent more than 84 consecutive days in space, twelve cosmonauts have been up for periods exceeding six months.

Vladimir Titov and Musa Manarov drift through the heavens, 400 kilometres above the Earth, in a space station named *Mir*, which translates as "peace," "village," or "world." Their aim is to break the 326-day record of Yuri Romanenko and to survive more than a year in space. In reality, *Mir* is a scientific prison about the size of a bus and crammed with equipment. There are few home comforts: only a shower, a carpet, and a VCR. A gymnasium is equipped with a treadmill and a bicycle exerciser on which the cosmonauts work out for a minimum of two-and-a-half hours each day—just to stay alive.

The human body has evolved in Earth gravity. Remove gravity and the spine stretches by as much as seven centimetres, while blood drifts towards the head. With less work to do, the muscles of the heart and limbs degenerate. No longer needed to support the weight of the body, bones decalcify and weaken. Over the years the Soviet scientists have increased the exercise performed by their cosmonauts to avoid the serious bodily deterioration that marked their first long space flights, but no one can be sure what will happen as a result of trips in space of several years' duration.

Oleg Atkov, a thirty-nine-year-old Moscow cardiologist, should understand better than anyone else the nature of the problems facing the next generation of space pioneers. He has been involved in space medicine since 1975 and in 1984 he was one of a three-man crew on the space station *Salyut*. His team remained in orbit for 237 days—a Soviet record that held for two years, and nearly three times longer than any American has spent in orbit.

In 1987 when Yuri Romanenko neared the end of his ten-and-a-half-month *Mir* flight, he was so mentally tired that he became irritable with ground control and his working day had to be reduced from ten to four-and-a-half hours. His total muscle mass may have declined by as much as fifteen per cent, but he still kept up his daily exercises. There are varying reports about his condition when he returned to Earth, and Western aerospace physiologists have difficulty interpreting Soviet data. They would also like to know more about Romanenko's recovery after the return. While Romanenko was officially reported as being fitter than he had been after shorter, earlier flights, and running or walking 100 metres a day after his return, unofficial stories describe him as unable even to sit up in bed. The spring following his historic journey, Romanenko joined Atkov for a scuba-diving trip in Cuba. This brief re-entry into near weightlessness must have been a blissful relief for his weary, shrunken limbs.

Following Romanenko's epic flight, Atkov is more optimistic about the prospects for humans in space. He no longer thinks that voyages lasting more than a year are likely to prove physiologically impossible, although he believes that future spacecraft will have to be fitted with shielding against cosmic rays and be capable of rotation to generate artificial gravity. It's the psychological problems that worry Atkov most.

In time a cosmonaut's routine becomes terribly boring. Repeated scientific tasks seem petty and trivial, and tempers can be pushed to the breaking point. Home is so very far away. Seen from *Mir*, *Salyut*, or a shuttle in low Earth orbit, the Earth fills cabin windows and rolls out below like a blue-green, cloud-flecked carpet. Cosmonauts and astronauts agree that it is the most beautiful sight that human eyes have ever seen. But on a voyage to Mars, the Earth will shrink into the background of stars. "That will make a cosmonaut feel very, very lonely; very far from home," says Atkov. He missed his wife and his fifteen-year-old daughter during his eight months in *Salyut* and says that for that reason alone he would not like to go up again.

Like most Soviets, Atkov is reticent in conversations having anything to do with sex, but he does admit that for extremely long flights mixed crews may be better. During his flight, *Salyut* was visited by two Soyuz spacecraft, each with three cosmonauts on board, including the second Soviet spacewoman, Svetlana Savitskaya. She stayed on *Salyut* for one week and said afterwards: "It's the job that counts. Whether it's done by a man or a woman is irrelevant." Life might not be so simple with flights lasting years.

In 1984 Canadian astronaut Marc Garneau spent eight days in the shuttle *Challenger*. He was part of a crew of seven, which included Sally Ride and Kathy Sullivan. Garneau believes that men and women can complement each other very well in the stressful situations that arise in space. While his

Soviet cardiologist and cosmonaut Oleg Atkov performs tests on fellow cosmonauts aboard the *Salyut*.



PHOTOGRAPH COURTESY THE U.S. R. EMBASSY IN CANADA



PHOTOGRAPHY COURTESY NASA



PHOTOGRAPHY COURTESY NASA

Top: Marc Garneau (left) and Paul Scully-Power perform a proprioception test aboard the *Challenger* on Mission 41-G, October 1984.

Bottom: Aboard *Columbia* Owen K. Garriott draws blood from Byron K. Lichtenberg for later testing on Earth.

physiologist colleague, astronaut Ken Money, muses on the possibility of astronaut couples, Garneau predicts that the next century might see a child born in space. (Born, not conceived. Experiments involving bird eggs, tadpoles, and germinating seeds in weightless conditions have ended in failure, suggesting the importance of gravity to embryonic development.)

Space medicine is a field of intense research in Canada. Ian Howard of York University and other scientists are carrying out extensive work in the area of disorientation (see sidebar). While the problems being studied by these Canadian scientists will probably be at least partially resolved, the more profound problems associated with prolonged weightlessness and space travel are not as easy to answer. For expeditions lasting longer than a year, spaceships may need more than artificial gravity and protection against cosmic rays. It will not be easy to keep minds and bodies fit during months of relative inactivity. If humans are to continue the exploration of space, huge technological advances will have to be made in their spacecraft. For instance, suspended animation could be the answer for really long flights. Crews would endure their voyages in a kind of hibernation. But animals that hibernate have muscle tissue which, unlike ours, does not degenerate rapidly during periods of inactivity. There are no easy solutions to the problems faced by humans in space.

A worthwhile expedition to Mars would last two to three years. For a crew of three this would mean 4.5 tonnes of food, 10 of oxygen, and 17 of water. Supplies can be reduced by recycling waste air and water, as well as by supplementing diets with algae grown in space. A Mars explorer ship will be too heavy to be lifted off the Earth in one piece, and so it will be assembled in sections in low Earth orbit—a process that will take about a year to complete. The costs of such a project will be enormous: American astronomer Carl Sagan estimates at least \$100 billion. This could exceed the economic resources of either the U.S.S.R. or the U.S.A.

Inspired by the new spirit of cooperation, the Soviets have proposed a joint U.S.S.R./U.S. manned expedition to Mars, but most experts think that this

Lost in space: Canadian scientists research ways for astronauts to keep their heads up

Motion sickness and disorientation caused by conditions of weightlessness are serious problems for space travellers. Attempts have been made to recreate conditions of weightlessness on Earth as part of the space training for astronauts. In Toronto potential astronauts are tumbled in all directions in the Precision Angular Mover at the Defence and Civil Institute of Environmental Medicine, an ordeal that Canadian astronaut Marc Garneau remembers with loathing. However, the experience on Earth may not count for much during real space travel. For some, like Garneau, the effects of the two experiences are quite different: nausea on Earth, little discomfort in space. It's a mystery that fascinates physiologist Ken Money because he has found that fitness is involved, but in a surprising way. Putting a person through a fitness program seems to make him or her more, not less, susceptible to motion sickness in space. An astronaut can be acclimatized to one particular motion or to a set of motions under Earth gravity, but in space this training may turn out to be ineffective. What is needed is a spacecraft simulator capable of simultaneously recreating all the effects of weightlessness.

Ian Howard is head of the Human

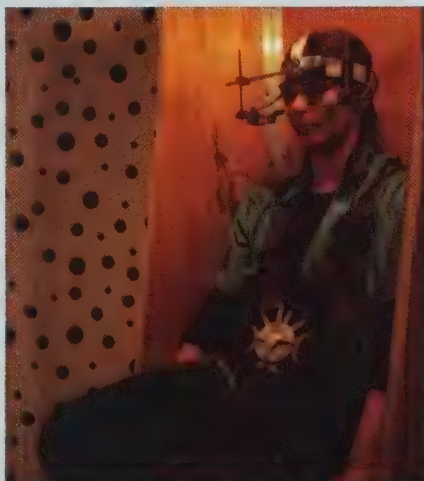
Performance in Space Laboratory at York University, where he has built an array of machines to simulate the physical and visual disorientations of space flight. The devices include a rotating room and a chair enclosed in a whirling sphere that is painted on the inside with black dots. The effects that are created by these machines are very confusing to the eye.

By investigating the visual stimuli that generate feelings of disorientation and motion sickness, Howard hopes to recreate the stimuli as computer-generated images that may be presented through the eyepieces of a helmet developed by CAE Systems Ltd. of Montreal for use in flight simulators. With this helmet, giant rotating spheres and life-size revolving rooms are reduced to optical illusions borne on a microchip—a miniaturized environment that may be flown in the NASA "vomit comet."

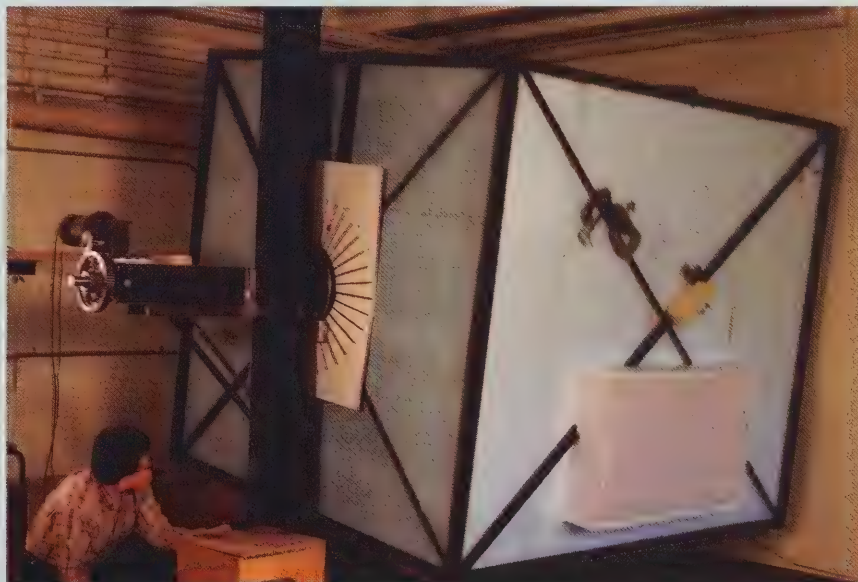
The vomit comet is a flying laboratory capable of making steep dives that create periods of weightlessness for twenty to twenty-five seconds. Heading out over the Gulf of Mexico, it flies like an aerial roller-coaster. With every plunge, rookie astronauts and space scientists go into a free fall. Loose equipment and crew float as they

would in space. Vital tests are crammed into less than half a minute of experiment time for as many as forty parabolas in a single flight. For some it's more fun than a trip to Disneyland; for others it's three hours of sheer misery. Howard and Money hope that their research will result in the alleviation of Space Adaptation Syndrome, a period of three days or so at the beginning of a space flight when about half of all space travellers suffer from disorientation and motion sickness. It will also help astronauts adapt to a phenomenon—loss of proprioception—investigated by Garneau during his eight-day flight on the *Challenger*.

Proprioception is the sensation of pressure and tension in the muscles and joints that tells us where our limbs are. In zero gravity, a person with eyes shut has no up or down and cannot tell whether he or she is turning or standing still, and with weightless limbs, proprioception is not very reliable. Loss of proprioception can be tricky for an astronaut or cosmonaut who has to leave the spacecraft to work on its shaded side. According to Marc Garneau: "From three inputs to your sense of balance you are reduced to less than one-and-a-half."



Volunteers for proprioception experiments may find themselves in a chair enclosed in a whirling sphere with a black dot decor or in a rotating room.



idea is fraught with obstacles. Marc Garneau believes that a Mars crew would need to spend at least five years training together on Earth and in space. The only precedent is the 1975 link-up of Apollo and Soyuz, which lasted only a few hours in what amounted to little more than a \$300 million public relations stunt of little scientific value. Further cooperation was planned, but this was scuttled by the Soviet intervention in Afghanistan in 1979.

No single country can afford the risk of a project as costly as the first manned expedition to Mars. Nor can any country afford the consequences, in such an expedition, of avoidable technical or human failure. The problems associated with enterprises involving people of different cultural backgrounds are too numerous to be ignored. While technological cooperation in the future exploration of space is happening already, international manned expeditions to Mars may have to wait until unmanned voyages become routine.

A final question remains. Why would anyone really want to visit Mars? After having endured eight months to a year trapped in their spacecraft, the cosmonauts or astronauts will set foot on a bleak, waterless planet that is little more than half the size of Earth and has only one third of its gravity. The Martian atmosphere is ninety-five per cent carbon dioxide, so humans will have to wear spacesuits all the time and carry a supply of oxygen. Temperatures vary from a high of around 60°C to a low of -120°C, which is so cold that the atmosphere begins to freeze. Mars is frequently covered by a fog twenty to fifty kilometres thick, and is further obscured from our view by seasonal dust-storms, which may blow at speeds of several hundred kilometres per hour and which inspired the popular name "red planet."

However, for the truly adventurous the geography of Mars is spectacular. There are extinct volcanoes that reach up to twenty-seven kilometres (three-and-a-half times higher than Everest) and a canyon that is five thousand kilometres long and two hundred kilometres deep, making the Grand Canyon a mere scratch by comparison.

During their explorations of the planet, cosmonauts and astronauts will be on the lookout for Martian life. Although Mars has been touted for at least two centuries as the only other body in the solar system, besides Earth, capable of supporting living organisms, exploration has brought only disappointment. First there were the famous canals. They faded as telescopes improved, and they vanished forever when spacecraft first orbited Mars in the 1970s. Then there were so-called patterns of vegetation that turned out to be nothing more than seasonal dust-storms. In 1976 two U.S. Viking landers became the first man-made objects to settle on the Martian surface. They analysed the soil for signs of organic activity but found nothing.

The latest find is a rock shaped like a human face. It's a discovery in which the Soviets have shown little interest; they have more serious work to do. There remains a slight chance that life of a very primitive sort does exist on Mars, maybe where the ground is warmed by any remaining heat in the rocks surrounding its apparently extinct volcanoes. However, there is almost certainly no possibility of an encounter between intelligent Martians and the visiting Earthlings.

Yet the Soviet Union has decided to spend billions of roubles over the next decade so that its cosmonauts may explore a planet bleaker than the Gobi Desert. Many astronomers think the whole idea of humans in space is expensive, dangerous, and simply unnecessary. They point out the limited returns of the manned expeditions flown to date, and compare those with the achievements of unmanned craft. But, in the end, the idealists will probably have their way.

For most people, images of astronauts or cosmonauts drifting through space and bouncing on the moon have roused emotions that cannot be matched by mere robots. They want the universe to be explored by real people, not machines. When humans set foot on Mars they will be inspired by the same motives—idealism, curiosity, greed, and fear of being beaten by their neighbours—that spread their ancestors over planet Earth. They'll go to Mars because it is there, because they are here, and because they are human.☺

Richard Longley is producer for CBC Television's The Nature of Things.

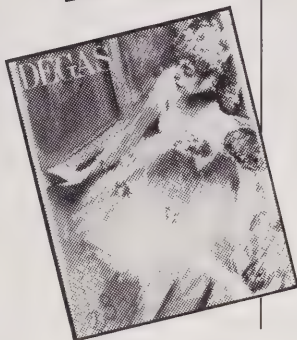
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"Famous last words."

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"I know. But it's a big occasion and you'll be out with your friends. If you wind up having a few drinks you mightn't be so terrific driving home."

"I won't drink. I promise."

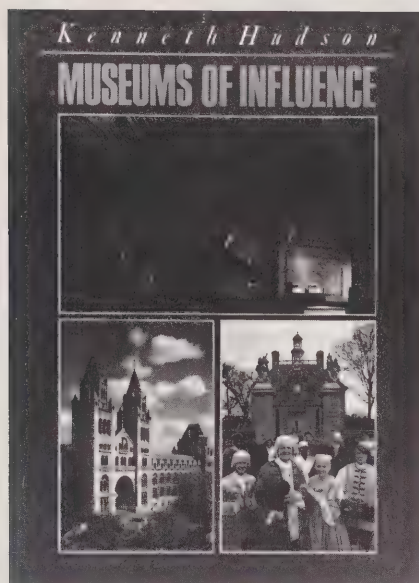
"That's easy enough to say now."

"Well, I can always get a lift back with one of the others."

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Museums of Influence
K. L. Hudson
Cambridge University Press
220 pp. \$41.95 (cloth)

*Reviewed by Julia Matthews, head,
Library & Archives, ROM*

Museums of Influence is a stimulating
book for those who work at or visit

museums. The thirty-seven institutions highlighted, as well as the many others cited, have been chosen because they have changed our expectations about what museums can and should do.

Kenneth Hudson characterizes himself as a professional student of museums. A decade ago, having been commissioned by UNESCO to travel and seek out the most important new ideas in the museum world, he wrote *Museums for the 1980s: A survey of world trends*. His previous work, *A Social History of Museums* (1975), compiled the reactions of famous and ordinary museum visitors over three hundred years. He has also co-edited a directory of museums of the world. Hudson's viewpoint is that of a serious and passionate museum visitor with biases that are explicit and consistent. For example, he has not included an ethnographical museum because "none contrives to communicate the essential features of the societies with which the museum collection is concerned . . .



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SALES/LEASING/SERVICE/PARTS

with very rare exceptions, [their displays] present the surface of a society."

The chapters are arranged by type of museum: "Temples of Art," "History Where It Happened," and so on. For the reader, this approach also elucidates the influences on the museums of influence. There is, for instance, a fascinating analysis of the Great Exhibition of 1851 and the resulting development of the South Kensington complex on land purchased with the profit realised by the Exhibition.

The Victoria and Albert Museum, part of this complex, is discussed at length. Three photographs are devoted just to the restaurant, which was a "daring innovation" in 1857 and the first museum restaurant in the world. Other influential features of the V & A are its popularity with the public, especially the working and middle classes; the use of the collections by students and classes in art and design; the scope of collections policy covering "practical as well as unpractical arts;" and the building itself as a permanent advertisement for craftsmanship. Reading this section is instructive for a student of the ROM's history because these are the standards that our founders wanted to bring to Toronto.

Leadership is a recurring theme. In his chapter on natural history museums, zoos, and botanical gardens, Hudson devotes pages to natural historian Sir William Henry Flower of the British Museum, "the greatest museologist in Britain during the Victorian period." There is a splendid photograph of the man in front of one of his display cases. Flower was interested both in research facilities and in improved displays for the general public. Sadly, "the money and the will to build large science museums had arrived just in advance of the theories which would allow such museums to be used properly." In North America, science museums were built about a decade later, which meant that their founders could improve upon the European institutions.

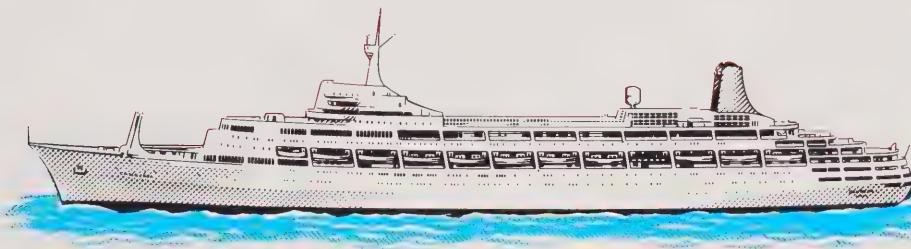
Recently, the British Museum of Natural History reorganized its galleries to "demonstrate the diversity of the living world," with special attention to the ways in which all living things interact. Flower would recognize this goal. Hudson states that this activity is a response to a worldwide movement, and he scolds the BMNH for remaining politically cautious, in contrast to the Senckenberg Museum in Frankfurt and the Goulandris Museum in Greece. The Senckenberg Museum has an exhibition program related to matters of social importance such as pollution. The program is based on the belief that "the intellect is more likely to function if it is encouraged by the emotions." The Goulandris Museum, with its educational programs and nature conservation projects, is privately funded yet considers itself to be "the conscience of a nation."

No Canadian institution has been selected, though the Ontario Science Centre is mentioned, and in *Museums for the 1980s*, Hudson praises Canada's attention to leisure time and visitor studies. To these, I would add a style and technology first exemplified by Expo '67, plus standards for collections documentation and management.

The final chapter, "Pointers to the Future," is the most contentious. It is a forecast that sums up Hudson's ideas on the role of museums in the coming decades. He proposes five issues that comprise the greatest "perplexities, yearnings, frustrations and opportunities of mankind." Hudson feels that museums may have a useful role in the illustration of these problems although they are not suitable agencies for problem solving. He argues that museums must give their visitors confidence at the point where the gap between the social and intellectual elite and the masses is widening. "The very large museums cannot do it because they are powerhouses of omniscience and academic attitudes, and the very small are unlikely to achieve much . . . because . . . they lack the resources."

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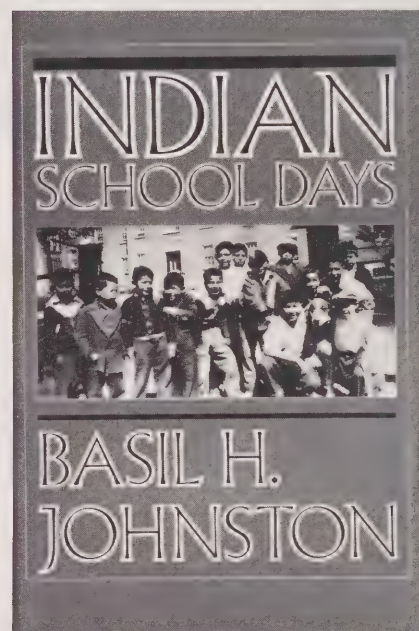


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— BOOK REVIEWS —

He concludes with a haunting challenge: to succeed, museums must be financially viable within their own economies; they must link themselves with their communities to satisfy real rather than imagined tastes and needs; and, above all, they "must not lose sight of the essential truth contained in the apparent paradox that successful popularisation can be achieved only on the basis of sound scholarship." Some will fail and some will fade away and "possibly die from a surfeit of learning, dullness, obstinacy and arrogance." ☹



Indian School Days

Basil Johnston
Key Porter Books
250 pp. \$24.95 (cloth)

*Reviewed by Krystyna Sieciechowicz,
Department of Anthropology,
University of Toronto*

The theme of this book is quite straightforward: a description of life in a northern residential Jesuit school for Indian boys. However, if you take a moment to consider such a situation, you begin to imagine its complexity. There are all the diverse personalities, the ambivalent feelings, the subtle contradictions, and all the structured conflicts and ironies that abound in a school

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BOOK REVIEWS

designed for the Indian childrens' "own good." In a wonderfully simple storytelling style Johnston unravels a sentimental, moving, funny, and always complex account of his days at St. Peter Claver's Indian Residential School in Spanish, Ontario.

Life was hard, bitter, and bleak for the children attending the school. Their day began very early and for ten months of the year, until their sixteenth birthdays, it was an unbroken chain of one routine following the next. The children lined up for breakfast or lessons or prayers and then worked in the fields, the chicken coops, the barns, the blacksmith shop, the tailor shop, or the cobbler shop. "The system in Spanish, the Jesuit system, [was one of] always playing, always [being] occupied in something or other; [we were] seldom permitted to lounge or relax, even after meals."

The school was designed to be self-sufficient and to promote self-sufficiency in the students, who were supposed to learn not only their subjects but also skills that would give them trades in their adult lives. The plan was too simple and too ignorant not only of cultural differences but also of the times. The school, strict as it was, succeeded in teaching its charges an impressive array of subjects but produced neither tradesmen nor priests.

The children experienced intense loneliness for and alienation from all that was family, home, and Indian. Whereas this problem is fairly well documented in other works and is quite familiar to those in the fields of native studies and anthropology, Johnston, in *Indian School Days*, attempts to convey the residential school experience to the wider public. The book succeeds admirably in this task. Without archly lecturing the reader on the evils of removing very small (even three-year-old) children from their homes, or simplifying the issues, or falling into the trap of becoming an apologist for the system, Johnston nimbly intertwines episodes, feelings, thoughts, and conflicts. His objective is to make the reader

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realize that the residential school experience cannot be simplified or reduced to single factors. He makes it clear that there were teachers who cared, but nevertheless did not understand from a child's perspective. He shows how the children were required to respond to "order, authority, discipline, efficiency, system, organization, schedule, regimentation, and conformity," and the price they paid for it.

The sense of barely suppressed seething anger at the injustices that he and so many other young children suffered permeates the first part of the book. There is the repeated image of children, muffling their whimpering, in the large dormitory at night; the whimpering being the only permissible expression of profound loneliness.

Later, as a young teenager, clearly adjusted to "the system" and revelling in his friendships made at the school, Johnston recounts that once a month he would get to see his four-year-old sister who was attending the girls' residential

school. They did not know what to say to one another, and so his sister would just cling to his leg until it was time to part. Johnston does not dwell melodramatically on these saddening incidents, he does not exploit them, but inserts them to evoke the social tragedy of a particularly harsh residential school system.

Most of the book is, however, very funny. It is full of hilarious escapades devised by the boys to alleviate the deadening routines of life. My favourite story is the one Johnston tells about the stiff, painted denim football pants that the team had to wear because there were no real uniforms. The story combines an insight into the supervising Jesuit coach's efforts to overcome all obstacles and the repercussions these efforts had on the boys.

The pants were so stiff that they gave way at the in-seams during the game. Johnston draws a wonderful picture of the proud Indian boys running awkwardly to prevent their

— BOOK REVIEWS —

backsides from showing but winning the game nevertheless. Johnston tells how hard the coach worked to pull together the pseudo-uniforms, how on short notice Johnston and his friends worked to sew them from old clothes, how they painted the uniforms, dried them on the fencing, wore them, and were victorious. But when the boys approached the same father to intercede on their behalf on another matter, he would not.

The conclusion one draws from this is that the boys were part of the structure, they were instrumental in the good working order of the institution and little could be done to deter the fathers from the overall plan. In a later section, Johnston writes about the bean revolution. Suddenly baked beans, the favourite food of the boys, disappeared from their weekly diet. The boys tried everything to have beans reinstated. They were told that if they were unhappy with the school they could leave.

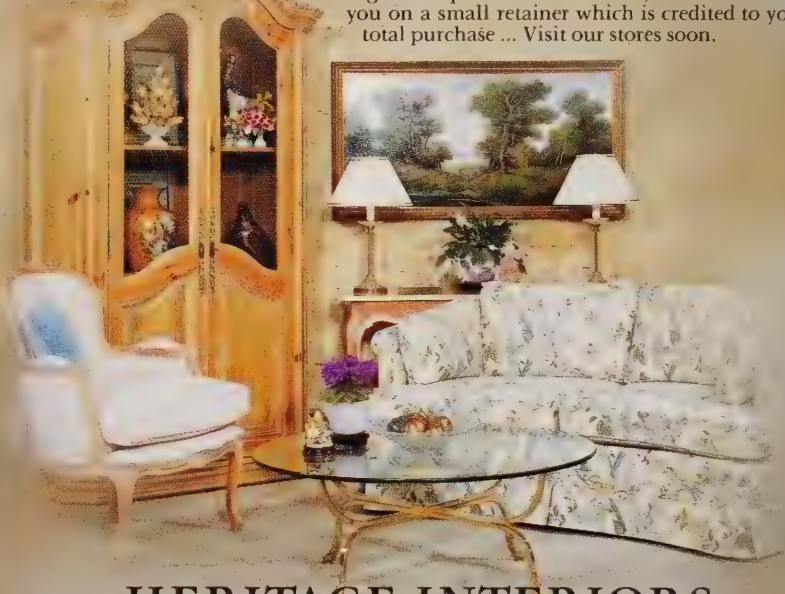
The system was hard. Because it was so hard, it was startling to read that when the high school program began (as a result of the intense commitment of the school principal even against incredible odds), the older boys who would have been free to leave the school agreed to stay on. Johnston even returned from home to attend the high school, the Garnier Residential School. This second phase of Johnston's schooling comes from a dedication to learning despite the system and from the realisation that school was preferable to the hardships of reserve life. The paradoxes thus abound, yet Johnston makes them understandable.

In the Appendix, Johnston gives a listing of his fellow pupils and some indication of what a few are doing now. It would seem that he is the only one to have "succeeded" in life in the non-Indian sense. One would have liked to learn more about his friends and how they fared upon leaving the school. But after all, that is another good story to be told. ☺



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1. The peal of church bells is a sound that's gradually disappearing from our soundscape, and it's a little known fact that at one time being a bell ringer was a hazardous occupation. In France from 1753 to 1786, one hundred bell ringers died, all from the same cause. What was it?

2. Why is it so quiet immediately after a snowfall? It's not just that there are fewer pedestrians or cars. Sounds are actually hushed or muffled, but why?

3. In 1987 a study revealed that the majority of a group of 348 airline reservation agents preferred the same ear for telephone use. These agents used headsets, so there was no need, for example, to hold a receiver against the left ear with the left hand in order to keep the right

hand free for writing or dialling. Which ear did they prefer?

4. Songbirds utter alarm cries when threatened by the sudden appearance of a hawk, and in many different species these warning cries are all roughly the same high, thin whistle. Why would different kinds of birds sound the same kinds of alarms?

5. In a lab in England several years ago, scientists recording from the brain of a woman named Ruth were startled to find that when Ruth thought that her daughter had turned off a machine producing audible clicks, Ruth's brain no longer reacted to them. Why would that be startling?

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1. They were killed by lightning. The high spires of the churches were excellent targets for lightning strikes, and the unfortunate bell ringers were sent to ring the bells to prevent those strikes. The pious believed that the ringing bells placated God and thereby kept the church safe, while the more scientifically inclined thought that the bell ringing caused some sort of disturbance in the air that interrupted the lightning strike. In fact, *fulgura frango* (I break up the lightning flashes) is inscribed on many 18th-century church bells. It was the act of grasping a sodden bell rope, an excellent conductor of the lightning's electrical current, that proved fatal to many of the poor bell ringers. The French parliament finally outlawed the practice in 1786.

The cruel irony was that Ben Franklin had performed his famous kite-and-key experiment in 1752, showing that storm clouds were electrified and that lightning was an electrical discharge not unlike a spark of static electricity. By 1753 the first lightning rod (the Franklin rod) had been installed in Philadelphia. That hazardous bell ringing could have been outlawed sooner if news had travelled faster, and if, after the news did arrive, European resistance to the new invention had been overcome sooner.

2. Newly fallen snow, before it has

become compacted by repeated melting or footsteps, is a honeycombed mass of snow and air spaces. It is like a thick version of the familiar acoustic tile—soft material with countless tiny holes punched in the surface, and it has the same effect on sound. Sound waves, besides being absorbed by the snow material itself, enter the holes and bounce back and forth in the tiny spaces, rather than reflecting directly out and back to your ears. So sounds are muffled. It's been reported from the Antarctic that people in freshly dug snow tunnels have difficulty hearing each other if they're more than about five metres apart.

3. Fifty-nine per cent of the whole group had a distinct preference for the left ear. This result contradicts some previous research that showed a preference for the right ear. In that case, however, people were simply asked which ear they would use to listen to a conversation behind a closed door, or into which ear they would stick a radio earphone. The airline survey result extends earlier research that suggested a preference for the left ear; however, the participants in that research did not have headsets, and many said they needed to hold a receiver in their left hand and use their left ear in order to keep their right hand free.

This research actually bears on an important psychological issue: the

majority of nerve fibres leaving the ear cross the brain and enter the cerebral cortex, the "thinking" part of the brain, on the other side. The right ear feeds the left hemisphere of the brain and vice-versa. In most people, the left hemisphere is the one that is specialized for language. Indeed many experiments have shown that, in special listening tests where one ear gets one message and the other a different message, the message heard through the right ear is remembered better.

So why did the majority of the airline agents prefer listening through the left ear? Two suggestions are offered: either the job had become so routine that these people no longer needed to bring their analytical skills (and the left hemisphere) to bear on it, or the calculation of the most efficient set of connecting flights requires dealing with spatial relationships, a speciality of the right hemisphere.

4. These alarm whistles are the most difficult kinds of sound to locate. One way a hawk could locate the calling bird would be to compare the difference in intensity of the sound arriving at both ears: if the songbird is on the right, the sound is louder in the hawk's right ear. But these alarm calls, although high pitched, would have to be higher still to be suitable for this kind of localization.

The hawk might also compare the phase difference at each ear: if the soundwaves are out of sync with each other, it suggests they didn't come from directly in front or behind, but had to travel different distances to get to the hawk's ears. However, this phase difference detection becomes too ambiguous if the wavelengths of the sound are too short, that is, if the pitch is too high. Sure enough, that's the case with the alarm calls. So the alarms are too low for intensity localization, but too high for phase.

Finally, a predatory bird can find a caller by measuring the difference in the time of arrival of a sound at the two ears, but that's easiest when the sound has a sharp, clear-cut beginning, like a click. These alarm whistles ease in and ease out, providing no such hard-edged cue.

5. Because Ruth's daughter wasn't even there. Ruth had conjured up an apparition of her daughter walking over to the machine and turning it off. The unconscious response of her brain to the clicks from that machine—the auditory evoked response—disappeared, even though the clicks were still clearly audible. This was an amazing demonstration on several levels, especially the way in which this woman could control her hallucinations, which were perceived as real even at a level in her brain over which she presumably has no direct control.

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